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GLOBAL DATA MONITORING REPORT

April 2003

Data Assimilation
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1. Introduction

As the WMO-appointed lead centre for monitoring surface marine data, the U.K. Meteorological Office produces monthly statistics on the quality of these observations received at RSMC Bracknell. This report includes this information along with statistics for most other types of data. The figures and tables contained herein are presented according to the agreed standards for the exchange of monitoring results.

The report is based on data received at the UK Meteorological Office Headquarters, Bracknell in time for inclusion into the appropriate analysis (the current cut-off time is approximately 7.2 hours after each analysis time). The evaluation of data quality is based on comparison with the appropriate 6-hour global model forecast (background) field, although to provide background values valid at the observation time for non-main hour data, time-interpolation of the T+3, T+6 and T+9 forecasts is used; and for sea surface temperature the background field is the analysis from the previous day. Generally, the background field is of high quality except in data sparse areas, tropical regions and areas close to steep orography where care should be taken in interpreting the statistics shown.

Comments or queries on the report are welcome and should be addressed to:-

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2 Global Data Monitoring Statistics

Ships, Fixed buoys, Platforms and Drifting buoys observations

TABLES 1and 2 contain lists of the stations which are considered to have returned suspect observations of pressure, windspeed, wind direction or sea surface temperature, as appropriate, during the month. The criteria for quality control are given on the header page for each table.

Figures 1 and 2 show 10 degree lat/long box average numbers of SHIP/SYNOP and DRIFTER observations received per day throughout the month at Bracknell and assimilated into model runs. All data are included. Box average values are plotted as the nearest whole number (values of x.5 are rounded up). Where the average is more than 999, then 999 is plotted. A box with no observations is blank. If the 24 hour average >0 but <0.5, then 0 is plotted.

Synop Observations

Table 3 contains a list of stations which are considered to have returned suspect observations of Pressure during the month. The criteria for quality control are given in the header page. The reporting practice of each station is included in the list of statistics.

At the UK Met. Office, we monitor SYNOP pressure after it has been interpolated to our Global NWP Model's surface height. For most synoptic stations (about 75%), the surface pressure (at the model surface) is calculated from the reported station-level pressure, or, if this is not available, the height of a standard pressure-level (e.g. 850 hPa or 700 hPa). If neither of these are available, or if the reported station-level pressure is deemed unreliable, the reported mean sea-level pressure is used (about 25% of SYNOPs).

Aircraft observations

Tables 4A (300-150 hPa) and 4B (1000-301 hPa) contain lists of statistics calculated from data received from all airline carriers.

Figures 3A (300-150 hPa) and 3B (1000-301 hPa) show 10 degree lat/long box average numbers of aircraft reports in AIREP/AMDAR code (including AIREP, ACAR, AMDAR, ASDAR and ADS) received per day throughout the month at Bracknell and assimilated into model runs. Observations with a vector wind difference (compared with the model background field) of >60 m s^{-1} have been excluded. Box average values are plotted as the nearest whole number (values of x.5 are rounded up). Where the average is more than 999, then 999 is plotted. A box with no observations is blank. If the 24 hour average >0 but <0.5, then 0 is plotted.

Figures 4A-7A (300-150 hPa) and 4B-7B (1000-301 hPa) show wind statistics for AIREP/ASDAR in AIREP/AMDAR code (including AIREP, ACAR, AMDAR, ASDAR and ADS). Observations with a vector wind difference > 60 m s^{-1} have been excluded. Statistics have not been calculated for 10 degree lat/long boxes containing <31 observations.

Figure	Parameter
4	Mean wind vectors
5	Mean observation - background wind vector
6	Mean observation-background speed (m s^{-1})
7	RMS observation-background vector (m s^{-1})

Radiosonde Observations

TABLES 5-7 contain lists of the stations which are considered to have returned suspect observations of geopotential height, vector wind or wind direction, as appropriate, during the month. The criteria for quality control are given on the header page for each table.

Figures 8 and 9 show 10 degree lat/long box average numbers of TEMP 500 hPa GEOPOTENTIAL HEIGHT and TEMP/PILOT 300 hPa WIND observations received per day throughout the month at Bracknell and assimilated into model runs. Data from all hours are included. Box average values are plotted as the nearest whole number (values of x.5 are rounded up). Where the average is more than 999, then 999 is plotted. A box with no observations is blank. If the 24 hour average >0 but <0.5, then 0 is plotted.

APPENDIX I shows details of the gross error limits used in TABLES 5 and 6 and the weights used in the RMS values in TABLE 5.

Satellite Observations

Figures 10-24 show satellite wind statistics for all geostationary satellites. All plots other than **AVAILABILITY** show average data where there are > 10 observations in a 10 degree lat/long box.

Figure	Parameter Plotted	Layer (hPa)
10	Availability/average daily number	701-1000
11	Vector mean wind (observed)	701-1000
12	Observation-background vector wind difference	701-1000
13	Mean observation-background speed differences	701-1000
14	RMS observation-background vector difference	701-1000
15	Availability/average daily number	401-700
16	Vector mean wind (observed)	401-700
17	Observation-background vector wind difference	401-700
18	Mean observation-background speed differences	401-700
19	RMS observation-background vector difference	401-700
20	Availability/average daily number	101-400
21	Vector mean wind (observed)	101-400
22	Observation-background vector wind difference	101-400
23	Mean observation-background speed differences	101-400
24	RMS observation-background vector difference	101-400

Figures 25-39 show sounding statistics from the polar orbitting satellite NOAA-15. Figure 25 shows the mean daily number of ATOVS soundings, and figures 26-39 show mean and standard deviation observation-background differences for brightness temperature, for selected channels.

Figure		Weighting function peak (hPa)
26	Mean	Surface (HIRS8)
27	SD	Surface (HIRS8)
28	Mean	700 (HIRS15)
29	SD	700 (HIRS15)
30	Mean	500-700 (HIRS11)
31	SD	500-700 (HIRS11)
32	Mean	400 (HIRS4)
33	SD	400 (HIRS4)
34	Mean	700 (AMSUA5)
35	SD	700 (AMSUA5)
36	Mean	300 (AMSUA7)
37	SD	300 (AMSUA7)
38	Mean	100 (AMSUA9)
39	RMS	100 (AMSUA9)

Figures 40-54 show sounding statistics from the polar orbitting satellite NOAA-16. Figure 40 shows the mean daily number of ATOVS soundings, and figures 41-54 show mean and standard deviation observation-background differences for brightness temperature, for selected channels.

Figure		Weighting function peak (hPa)
41	Mean	Surface (HIRS8)
42	SD	Surface (HIRS8)
43	Mean	700 (HIRS15)
44	SD	700 (HIRS15)
45	Mean	500-700 (HIRS11)
46	SD	500-700 (HIRS11)
47	Mean	400 (HIRS4)
48	SD	400 (HIRS4)
49	Mean	700 (AMSUA5)
50	SD	700 (AMSUA5)
51	Mean	300 (AMSUA7)
52	SD	300 (AMSUA7)
53	Mean	100 (AMSUA9)
54	RMS	100 (AMSUA9)

Figures 55-69 show sounding statistics from the polar orbitting satellite NOAA-17. Figure 55 shows the mean daily number of ATOVS soundings, and figures 56-69 show mean and standard deviation observation-background differences for brightness temperature for selected channels.

Figure		Weighting function peak (hPa)
56	Mean	Surface (HIRS8)
57	SD	Surface (HIRS8)
58	Mean	700 (HIRS15)
59	SD	700 (HIRS15)
60	Mean	500-700 (HIRS11)
61	SD	500-700 (HIRS11)
62	Mean	400 (HIRS4)
63	SD	400 (HIRS4)
64	Mean	700 (AMSUA5)
65	SD	700 (AMSUA5)
66	Mean	300 (AMSUA7)
67	SD	300 (AMSUA7)
68	Mean	100 (AMSUA9)
69	RMS	100 (AMSUA9)

N.B. All satellite sounding data is bias-corrected (and thinned) before being assimilated in the UKMO NWP model.

3 Composite Observing Systems for the North Atlantic (COSNA)

This section shows statistics for upper air (radiosonde and aircraft) and surface (drifter) data for the North Atlantic area for data received at Bracknell during the month.

TABLE 8 shows quality statistics for **Mean Sea-level Pressure, Windspeed and Wind Direction** received at Bracknell in DRIFTER code during the month for the area 10°N - 80°N, 85°W - 0°W.

TABLE 9 shows quality statistics for **Temperature and Vector Wind** received at Bracknell from aircraft during the month for the area 40°N - 70°N, 60°W - 0°W.

Table 10 - 13 show quality statistics **(Geopotential Height and Windspeed at 100 and 500 hPa)** for all TEMPSHIPS in the area bounded by 0°N - 90°N, 100°W - 40°E and selected TEMP stations within the same area.

Revisions

1. May 95 Monitoring statistics for NOAA-11 removed. Figures 25-27 now show data for NOAA-12
2. May 95 Notes giving details of observations included in wind direction statistics clarified and corrected.
3. August 95 Monitoring statistics for NOAA-14 added with figures 28-30.
4. February 96 Monitoring statistics for GOES-7 have been replaced by statistics for GOES-8 and GOES-9.
5. April 96. 500 km and 120 km SATEMs replaced by 120 km resolution temperature profiles produced locally from the radiances disseminated by NESDIS.
6. February 97 Monitoring statistics for Meteosat 5 have been replaced by statistics for Meteosat 6.
7. Sept 97 Monitoring statistics for NOAA-12 removed. Figures 25-27 now show data for NOAA-11
8. January 1998. Increase in resolution of UKMO global forecast model.
9. April 1998. GOES winds ceased on 2nd March 1998, and were replaced with GOES high resolution winds from 15th.
10. June 1998. Monitoring statistics for Meteosat-6 were replaced by monitoring statistics for Meteosat-7, from 3rd June.
11. June 1998. Corrections in our processing of radiosonde data resulted in a decrease in the number of 500hPa geopotential heights in Figure 8 of about 230 per 24 hours (compared with previous reports), and a small increase in the number of 300hPa winds in Figure 9.
12. July 1998. Meteosat-5 began transmitting winds from 2nd July, at 63 degrees East (over the Indian ocean), and this data is included in the statistics.
13. July 1998. GOES-9 (at 135W) was replaced mid-month by GOES-10 (initially at 105W, moving towards 135W).
14. February 1999. Problems with NOAA-11, and TOVS data ceased to be assimilated from 26 February.
15. March 1999. UKMO introduced 3-D VAR assimilation system on 29 March, and also began assimilating ATOVS data from NOAA-15.
16. May 1999. Included statistics for ATOVS sounding data from NOAA-15.
17. September 1999. Included statistics for high resolution visible winds from Meteosat-5 and Meteosat-7.
18. October 1999. The 3-D VAR assimilation system was upgraded on 19 October, including improvements in the assimilation of ATOVS radiances, use of SSM/I surface wind speed, an improvement in the calculation of surface pressure for SYNOPs, and thinning and revision of observation errors of aircraft data.
19. November 1999. High resolution visible winds from Meteosat-5 and Meteosat-7 removed until used operationally.
20. April 2000. Aireps in Table 4 and Figures 3-7 split into ranges 300-150 hPa (A) and 1000-301 hPa (B).
21. September 2000. Corrected an error affecting the mean positions of a minority of buoys in Table 2.
22. November 2000. An error in the production of Table 6 was corrected. Previously, some sondes with suspect vector winds were being missed.
23. April 2001. Included statistics for ATOVS sounding data from NOAA-16.
24. May 2001. Included statistics for sea surface temperatures from marine surface observations.
25. December 2002. Included statistics for ATOVS sounding data from NOAA-17.
26. December 2002. Meteosat-7 and Meteosat-5 SATOB winds replaced by higher resolution BUFR-coded winds.

TABLE 1

MONITORING OF MARINE SURFACE OBSERVATIONS
MONTHLY SUSPECT LIST - SHIPS, FIXED BUOYS AND PLATFORMS
MONITORING CENTRE: BRACKNELL
MONTH: April 2003

Monitoring procedures

Period :One calendar month.

Data monitored :Reports from each unique identifier for ships, fixed buoys and platforms.

Standard of comparison :Background field from UKMO global model.

Observation times :All hours

Elements monitored
:Mean sea level pressure (hPa).
:Wind speed (m s^{-1}).
:Wind direction (Degrees).
:Sea surface temperature (Degrees).

Parameters monitored

:NOBS :Number of observations received excluding duplicates.

:PGE :Percentage of observations with gross errors.

:%REJ :Percentage of observations flagged excluding those with gross errors.

:SD :SD of difference of observations from background values excluding those with gross errors.

:BIAS :Mean difference of observations from background values excluding those with gross errors.
N.B. a positive bias indicates the wind observation is veered to the background.

:RMS :Root Mean Square difference of observations from background values excluding those with gross errors.

GROSS ERROR LIMIT
:15 hPa (pressure)
:25 m s^{-1} (vector wind)
:10 degrees (sea surface temperature)

SELECTION CRITERIA :NOBS ≥ 20 , and one or more of the following:

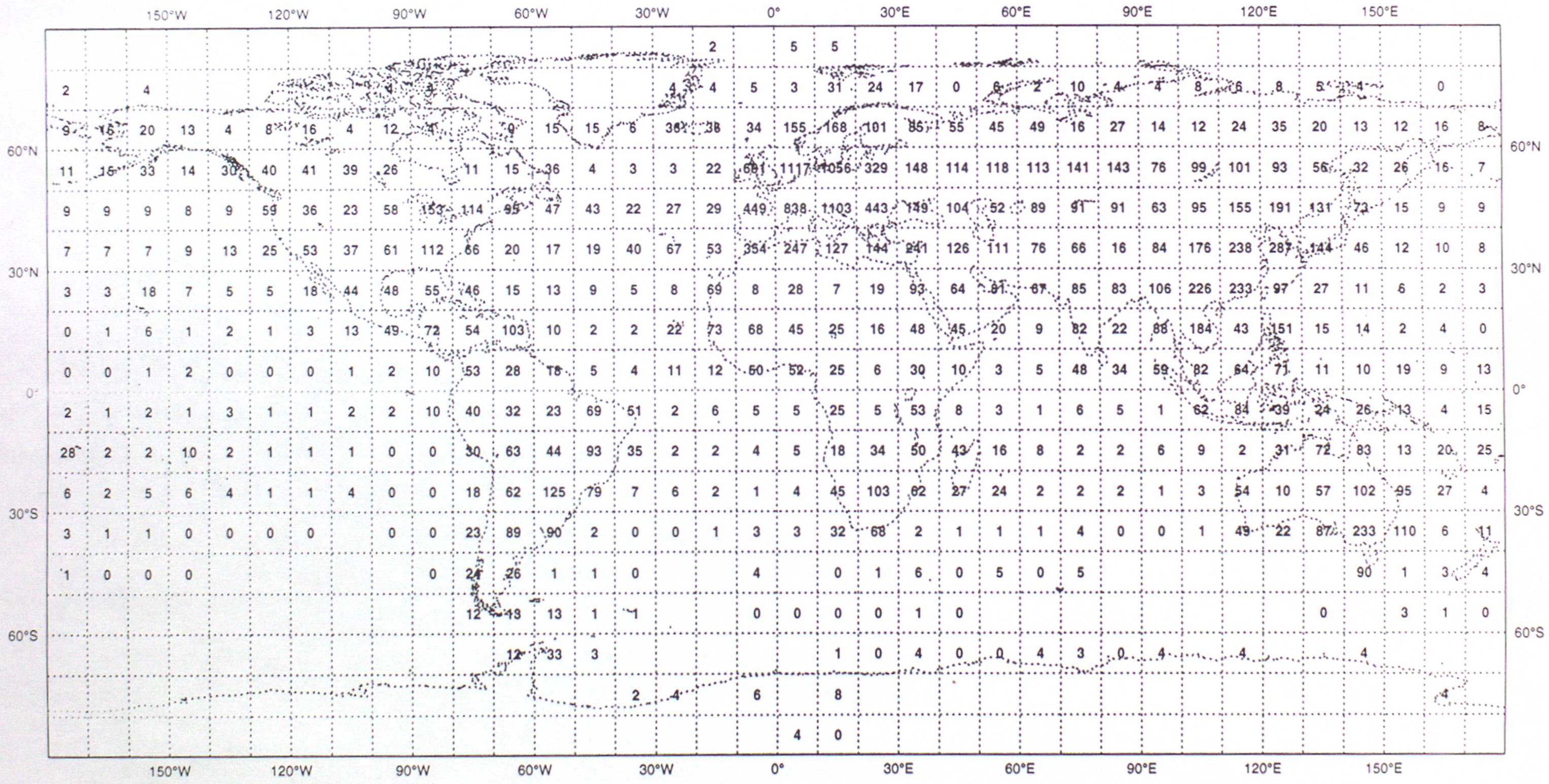
1.|bias|	≥ 4 hPa	(pressure),
	≥ 5 m s^{-1}	(wind speed),
	≥ 30 degrees	(direction).
	≥ 3 degrees	(sea surface temperature).
2.SD	≥ 6 hPa	(pressure),
	≥ 80 degrees	(direction).
	≥ 5 degrees	(sea surface temperature).
3.PGE	≥ 25	

N.B. Observations of wind direction are only included in the wind direction statistics if the observed OR background wind speed > 5 m s^{-1}

IDENTIFIER	ELEM	NOBS	PGE	%REJ	SD	BIAS	RMS
MEAN SEA LEVEL PRESSURE							
C6QK	P	20	0	100	2.0	8.5	8.7
LAOW5	P	27	0	4	1.3	6.0	6.2
OUKN2	P	52	2	100	1.2	-6.2	6.3
OWWS2	P	24	4	71	3.1	-5.9	6.7
P3YS5	P	54	0	0	1.2	5.2	5.3
S6JR	P	29	0	48	1.6	4.0	4.3
UHLE	P	49	2	10	1.5	-8.4	8.6
UIZE	P	106	0	99	1.9	-8.4	8.6
VCLX	P	21	100	100			
VMGO	P	25	4	56	2.8	4.9	5.7
V2AR5	P	53	0	55	1.1	-5.8	5.9
V2MH	P	70	0	21	1.4	-4.6	4.9
XPYM	P	67	1	3	0.8	4.5	4.6
3FOC5	P	28	0	50	1.2	5.6	5.7
62114	P	43	0	0	0.5	6.4	6.4
62301	P	624	18	100	5.0	4.5	6.7
WIND SPEED							
A8BJ9	SPEED	39	3	67	5.6	5.7	8.0
BBXX KS0	SPEED	448	0	100	2.4	-5.2	5.7
DGVZ	SPEED	24	0	25	6.7	5.7	8.8
DPGD	SPEED	24	0	0	2.2	7.0	7.4
KS000	SPEED	106	0	100	2.6	-7.1	7.6
KS007	SPEED	211	0	100	2.6	-6.0	6.6
KS010	SPEED	175	0	100	2.2	-5.2	5.6
KS025	SPEED	105	0	100	2.7	-5.0	5.6
P3AT9	SPEED	52	2	100	3.4	-5.7	6.7
UAST	SPEED	27	0	0	1.3	5.0	5.1
UCTA	SPEED	30	0	100	2.4	-5.1	5.6
UDUR	SPEED	29	0	100	4.3	-5.9	7.3
V2AQ3	SPEED	20	0	100	6.8	6.9	9.7
ZCBD2	SPEED	20	0	100	2.2	5.6	6.0
8PNZ	SPEED	20	0	10	2.1	5.2	5.6
9MBR8	SPEED	65	0	100	4.1	8.8	9.8
WIND DIRECTION							
UCUF	DIRN.	25	0	0	44.5	-33.3	55.6
VRVB6	DIRN.	40	0	0	35.2	30.7	46.7
SEA SURFACE TEMPERATURE							
CG2350	SST	111	41	46	2.2	1.4	2.6
CG2960	SST	268	46	100	1.6	1.2	2.0
CG8048	SST	51	100	100			
C6FE6	SST	23	0	48	1.6	3.8	4.1
C6IO9	SST	38	0	53	1.7	-3.5	3.9
C6QO9	SST	24	0	100	1.2	4.9	5.1
C6YW	SST	33	0	100	1.4	-3.3	3.6
DBBX	SST	450	52	100	1.2	0.6	1.4
DBBXX	SST	39	38	38	1.0	0.4	1.1
EIQN	SST	577	72	100	0.6	0.1	0.6
ELOG5	SST	52	2	100	1.1	5.7	5.8
ELWY3	SST	43	2	100	1.1	3.4	3.6
ELXO3	SST	37	0	70	2.0	-3.1	3.7
FNJI	SST	102	0	100	0.4	3.2	3.2
JKHH	SST	83	1	100	1.6	5.7	5.9
KGJX	SST	23	0	100	0.6	3.0	3.0
KS008	SST	53	53	87	2.5	-1.6	3.0
LACF5	SST	22	0	100	1.4	3.8	4.1
P3ZY6	SST	28	14	100	1.7	-7.5	7.7
UIAC	SST	72	0	88	2.2	6.7	7.1

IDENTIFIER	ELEM	NOBS	PGE	%REJ	SD	BIAS	RMS
SEA SURFACE TEMPERATURE							
UIAI	SST	72	1	94	0.7	-4.8	4.9
UIFC	SST	60	13	65	3.7	3.7	5.2
VCKM	SST	25	28	40	2.4	1.4	2.8
VGLZ	SST	27	100	100			
VJRB	SST	20	0	100	0.8	-4.7	4.7
VOCJ	SST	208	15	100	1.9	5.9	6.2
V2MA3	SST	99	1	35	3.0	-3.0	4.2
V7DP7	SST	27	0	100	0.8	-4.3	4.3
V7DU4	SST	38	5	74	1.8	3.4	3.9
WCW9126	SST	85	98	100	0.0	-2.3	2.3
WWU8	SST	28	100	100			
YJQL3	SST	37	0	100	0.8	-4.9	4.9
ZCBJ6	SST	27	7	41	2.1	3.0	3.7
ZMFR	SST	156	60	100	0.3	-9.4	9.4
3EBX6	SST	20	0	100	0.6	3.2	3.2
45142	SST	94	0	98	0.9	5.0	5.1
45149	SST	146	0	85	0.3	-3.3	3.4
46131	SST	657	100	100			
46146	SST	660	100	100			
46181	SST	664	100	100			

Figure 1. SHIP/SYNOP mean daily count. APRIL 2003
All hours
Global average number of observations in 24 hours = 21284


150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
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2 5 5
2 4 4 3 4 4 5 3 31 24 17 0 6 2 10 4 4 8 6 8 5 4 0
9 16 20 13 4 8 16 4 12 4 0 15 15 6 36 38 34 155 168 101 85 55 45 49 16 27 14 12 24 35 20 13 12 16 8
11 16 33 14 30 40 41 39 26 11 15 36 4 3 3 22 691 1117 1056 329 148 114 118 113 141 143 76 99 101 93 56 32 26 16 7
9 9 9 8 9 59 36 23 58 153 114 95 47 43 22 27 29 449 838 1103 443 149 104 52 89 91 91 63 95 155 191 131 73 15 9 9
7 7 7 9 13 25 53 37 61 112 66 20 17 19 40 67 53 354 247 127 144 241 126 111 76 66 16 84 176 238 287 144 46 12 10 8
3 3 18 7 5 5 18 44 48 55 46 15 13 9 5 8 69 8 28 7 19 93 64 81 67 85 83 106 226 233 97 27 11 6 2 3
0 1 6 1 2 1 3 13 49 72 54 103 10 2 2 22 73 68 45 25 16 48 45 20 9 82 22 88 184 43 151 15 14 2 4 0
0 0 1 2 0 0 0 1 2 10 53 28 18 5 4 11 12 50 52 25 6 30 10 3 5 48 34 59 82 64 71 11 10 19 9 13
2 1 2 1 3 1 1 2 2 10 40 32 23 69 51 2 6 5 5 25 5 53 8 3 1 6 5 1 62 84 39 24 26 13 4 15
28 2 2 10 2 1 1 1 0 0 30 63 44 93 35 2 2 4 5 18 34 50 43 16 8 2 2 6 9 2 31 72 83 13 20 25
6 2 5 6 4 1 1 4 0 0 18 62 125 79 7 6 2 1 4 45 103 82 27 24 2 2 2 1 3 54 10 57 102 95 27 4
3 1 1 0 0 0 0 0 0 23 89 90 2 0 0 1 3 3 32 68 2 1 1 1 4 0 0 1 49 22 87 233 110 6 11
1 0 0 0 0 24 26 1 1 0 4 0 1 6 0 5 0 5 90 1 3 4
12 13 13 1 1 0 0 0 0 1 0 0 3 1 0
12 33 3 1 0 4 0 0 4 3 0 4 4 4 4
2 4 6 8 4
4 0

TABLE 2

MONITORING OF MARINE SURFACE OBSERVATIONS
MONTHLY SUSPECT LIST - DRIFTING BUOYS
MONITORING CENTRE: BRACKNELL
MONTH: April 2003

Monitoring procedures

Period		:One calendar month.
Data monitored		:Reports from each unique identifier for drifting buoys.
Standard of comparison		:Background field from UKMO global model.
Position		:Average latitude and longitude for period.
Observation times		: All hours
Elements monitored		:Mean sea level pressure (hPa). :Wind speed ($m\ s^{-1}$). :Wind direction (degrees). :Sea surface temperature (degrees).
Parameters monitored	:NOBS	:Number of observations received excluding duplicates.
	:PGE	:Percentage of observations with gross errors.
	:%REJ	: Percentage of observations flagged excluding those with gross errors
	:SD	:SD of difference of observations from background values excluding those with gross errors.
	:BIAS	:Mean difference of observations from background values excluding those with gross errors. **N.B. a positive bias indicates the wind observation is veered to the background.**
	:RMS	:Root Mean Square difference of observations from background values excluding those with gross errors.
GROSS ERROR LIMIT	:15 hPa	(pressure)
	:25 $m\ s^{-1}$	(vector wind)
	:10 degrees	(sea surface temperature)

SELECTION CRITERIA :	NOBS	≥ 20 , and one or more of the following:	
	1.|bias|	≥ 4 hPa	(pressure),
		≥ 5 $m\ s^{-1}$	(wind speed),
		≥ 30 degrees	(direction).
		≥ 3 degrees	(sea surface temperature).
	2.SD	≥ 6 hPa	(pressure),
		≥ 80 degrees	(direction).
		≥ 5 degrees	(sea surface temperature).
	3.PGE	≥ 25.	

N.B. Observations of wind direction are only included in the wind direction statistics if the observed OR background wind speed > 5 $m\ s^{-1}$

IDENTIFIER	LAT.	LONG.	ELEM	NOBS	PGE	%REJ	SD	BIAS	RMS
MEAN SEA LEVEL PRESSURE									
14911	-12.2	62.7	P	536	2	70	2.5	4.6	5.3
17516	-48.4	11.8	P	209	11	53	6.8	-2.6	7.3
21901	39.9	150.4	P	51	90	100	1.0	-1.4	1.7
21904	45.9	156.4	P	35	100	100			
31537	-36.8	-15.5	P	73	36	41	1.4	-0.2	1.4
33512	-36.2	-43.5	P	350	21	80	4.6	-6.5	7.9
44617	46.5	-41.1	P	60	0	100	1.0	9.5	9.6
48574	73.8	-142.3	P	382	30	84	8.1	-2.0	8.4
53567	-11.1	77.5	P	167	0	92	2.2	7.5	7.9
55616	-54.0	172.8	P	622	3	56	3.4	4.2	5.4
55916	-55.7	175.7	P	618	2	100	3.1	4.2	5.3
56529	-56.5	117.7	P	708	20	100	4.2	6.3	7.5
61673	41.9	28.1	P	359	72	90	6.7	-1.4	6.8
WIND SPEED									
21901	39.9	150.4	SPEED	316	44	100	5.5	8.4	10.0
21904	45.9	156.4	SPEED	165	89	100	5.5	12.9	14.0
WIND DIRECTION									
21901	39.9	150.4	DIRN.	309	45	0	39.0	73.8	83.5
21902	35.8	153.0	DIRN.	240	0	0	26.7	82.1	86.3
21904	45.9	156.4	DIRN.	160	92	0	42.9	125.6	132.7
44585	41.6	-69.4	DIRN.	116	1	0	27.2	37.1	46.0
46701	39.5	-162.9	DIRN.	300	0	0	17.7	-40.6	44.3
SEA SURFACE TEMPERATURE									
14917	-34.8	35.2	SST	92	9	78	2.5	4.8	5.4
16563	-40.8	26.3	SST	23	4	100	0.6	4.8	4.9
17563	-28.8	-5.6	SST	986	100	100			
21595	24.4	131.0	SST	38	0	100	0.9	-6.2	6.3
32526	9.4	-84.8	SST	188	100	100			
33502	-29.5	-16.5	SST	95	5	100	0.8	4.1	4.2
46636	49.2	-123.1	SST	20	100	100			
46972	19.4	-148.5	SST	204	5	100	0.3	3.8	3.8
51761	-4.8	170.5	SST	229	0	100	1.3	3.4	3.7
51768	-5.3	170.6	SST	232	1	100	1.4	3.4	3.7
56532	-54.9	89.0	SST	669	20	100	1.5	4.8	5.1
62711	57.1	-56.1	SST	943	2	100	0.9	3.2	3.3
62712	61.6	-38.7	SST	1237	0	64	2.7	3.3	4.3
64522	60.6	-40.1	SST	359	11	84	3.0	5.5	6.3
64606	61.2	-56.9	SST	643	0	100	0.8	3.9	4.0

Figure 2. DRIFTER mean daily count. APRIL 2003
All hours
Global average number of observations in 24 hours = 9510

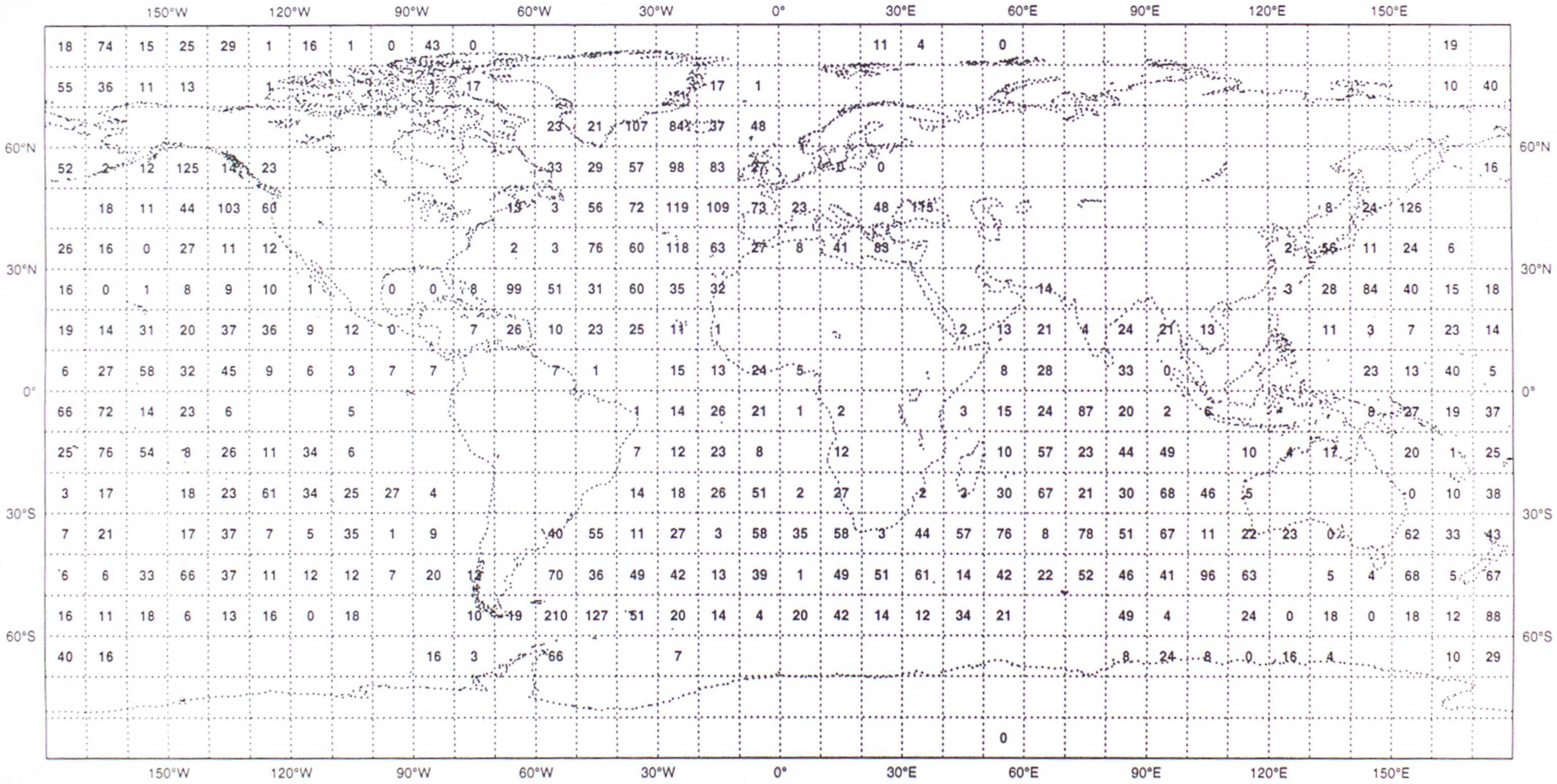

150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S
18 74 15 25 29 1 16 1 0 43 0 11 4 0 19
55 36 11 13 1 17 17 1 10 40
23 21 107 84 37 48
52 2 12 125 14 23 33 29 57 98 83 27 0 0 16
18 11 44 103 60 15 3 56 72 119 109 73 23 48 115 8 24 126
26 16 0 27 11 12 2 3 76 60 118 63 27 8 41 83 2 56 11 24 6
16 0 1 8 9 10 1 0 0 8 99 51 31 60 35 32 14 3 28 84 40 15 18
19 14 31 20 37 36 9 12 0 7 26 10 23 25 11 1 2 13 21 4 24 21 13 11 3 7 23 14
6 27 58 32 45 9 6 3 7 7 7 1 15 13 24 5 8 28 33 0 23 13 40 5
66 72 14 23 6 5 1 14 26 21 1 2 3 15 24 87 20 2 6 8 27 19 37
25 76 54 8 26 11 34 6 7 12 23 8 12 10 57 23 44 49 10 4 17 20 1 25
3 17 18 23 61 34 25 27 4 14 18 26 51 2 27 2 3 30 67 21 30 68 46 5 0 10 38
7 21 17 37 7 5 35 1 9 40 55 11 27 3 58 35 58 3 44 57 76 8 78 51 67 11 22 23 0 62 33 43
6 6 33 66 37 11 12 12 7 20 12 70 36 49 42 13 39 1 49 51 61 14 42 22 52 46 41 96 63 5 4 68 5 67
16 11 18 6 13 16 0 18 10 19 210 127 51 20 14 4 20 42 14 12 34 21 49 4 24 0 18 0 18 12 88
40 16 16 3 66 7 8 24 8 0 16 4 10 29
0

TABLE 3

MONITORING OF LAND SURFACE OBSERVATIONS
MONTHLY SUSPECT LIST - SYNOPS & AUTOSYNOPS
MONITORING CENTRE: BRACKNELL
MONTH: April 2003

Monitoring procedures

Period		:One calendar month.
Data monitored		:Reports from each unique identifier for synops & autosynops.
Standard of comparison		:Background field from UKMO global model.
Observation times		:00, 06, 12, 18 UTC
Elements monitored		:Surface pressure (hPa).
Parameters monitored	:HT(m)	:Station height (in metres) as given in WMO No. 9 Vol A
	:RP	:Pressure reporting practice M=mean sea level pressure (hPa) reported. S=Station level pressure reported. 8=Geopotential height (m) of 850 hPa surface reported. 7=Geopotential height (m) of 700 hPa surface reported.
	:NOBS	:Number of observations received excluding duplicates.
	:NGE	:Number of observations with gross errors.
	:PGE	:Percentage of observations with gross errors.
	:%REJ	:Percentage of observations flagged excluding those with gross errors.
	:SD	:SD of difference of observations from background values excluding those with gross errors.
	:BIAS	:Mean difference of observations from background values excluding those with gross errors.
	:RMS	:Root Mean Square difference of observations from background values excluding those with gross errors.
GROSS ERROR LIMIT	:15 hPa	(pressure)
SELECTION CRITERIA	:NOBS	≥ 20 ,and one or more of the following:
	1.|bias|	≥ 4 hPa
	2. SD	≥ 6 hPa
	3.PGE	≥ 25.

N.B. For stn ht ≥ 500m, mslp is that calculated from station level pressure where available.
For stn ht < 500m, mslp is that as reported by the station where available.

WMO REGION 1:

STATION	LAT	LONG	HT(M)	RP	NOBS	NGE	PGE	%REJ	SD	BIAS	RMS
60728	36.4N	10.7E	1	MS	58	0	0	0	0.8	-8.5	8.5
61816	10.9N	14.3W	69	M	22	8	36	0	0.5	-1.3	1.4
62271	24.2N	23.3E	417	M	48	0	0	4	1.9	4.1	4.5
62730	15.5N	36.4E	500	MS	61	1	2	20	3.2	-4.4	5.4
62790	12.1N	24.9E	674	MS	57	2	4	5	1.5	4.2	4.5
63160	10.4N	45.0E	9	M	24	0	0	4	3.6	-4.5	5.8
63801	4.9S	29.6E	882	S8	62	1	2	0	0.9	7.9	8.0
63881	8.0S	31.6E	1923	S	23	0	0	43	0.6	12.1	12.1
65355	9.8N	1.1E	342	MS	100	0	0	0	0.9	-11.8	11.8
67223	13.1S	39.0E	534	S8	60	1	2	0	0.8	12.2	12.2
67308	22.1S	31.7E	452	M	21	21	100	0			
68014	19.6S	18.1E	1411	S8	76	0	0	1	0.8	-7.2	7.2
68030	18.5S	25.6E	1071	8	84	0	0	0	2.1	4.3	4.8
68312	26.5S	18.1E	1067	S8	84	0	0	0	0.8	5.1	5.2
68338	26.9S	24.6E	1234	S8	70	70	100	0			
68396	26.5S	31.3E	641	S8	54	0	0	2	1.3	4.4	4.6
68575	30.0S	30.0E	1175	S8	115	115	100	0			

WMO REGION 2:

STATION	LAT	LONG	HT(M)	RP	NOBS	NGE	PGE	%REJ	SD	BIAS	RMS
30554	54.5N	113.6E	995	MS	119	1	1	0	5.9	5.3	7.9
36982	41.9N	78.2E	3635	S7	118	0	0	0	0.9	6.7	6.8
38565	40.6N	65.7E	485	MS	119	54	45	0	1.4	-0.1	1.4
40435	24.5N	44.4E	991	MS	26	3	12	88	1.0	7.5	7.6
40700	39.6N	47.9E	45	MS	98	2	2	0	1.1	-5.3	5.4
40713	37.4N	46.3E	1475	MS	91	3	3	0	0.9	12.9	12.9
40741	36.5N	61.2E	235	MS	88	0	0	0	1.0	-4.9	5.0
40757	35.6N	53.4E	1171	MS	86	0	0	6	1.4	4.1	4.3
40780	33.6N	46.4E	1362	MS	90	0	0	0	0.8	5.2	5.3
41254	23.1N	57.6E	1755	S8	54	54	100	0			
41396	16.0N	48.9E	700	MS	45	0	0	0	1.1	6.4	6.5
44265	46.1N	91.5E	1186	MS	119	1	1	1	1.6	4.4	4.7
44416	28.6N	81.6E	720	MS	68	0	0	6	2.3	4.0	4.6
47022	40.8N	128.2E	1224	S	105	4	4	4	1.6	4.1	4.4
48924	21.1N	101.5E	644	M	31	1	3	3	1.3	11.4	11.5
48925	20.7N	102.0E	550	S	33	1	3	0	1.3	-10.0	10.1
48938	19.2N	101.7E	326	M	43	28	65	0	5.7	12.3	13.6
50727	47.2N	119.9E	1028	MS	120	0	0	0	0.7	4.4	4.5
51495	43.2N	91.7E	874	M	118	0	0	1	1.7	7.0	7.2
52866	36.6N	101.8E	2262	S	120	0	0	0	1.2	-4.5	4.7
56462	29.0N	101.5E	2994	S	120	0	0	1	1.6	8.3	8.5
56768	25.0N	101.5E	1773	S	120	0	0	0	0.9	-5.3	5.4
57816	26.6N	106.7E	1074	MS	120	91	76	0	0.4	-14.5	14.5

WMO REGION 3:

STATION	LAT	LONG	HT(M)	RP	NOBS	NGE	PGE	%REJ	SD	BIAS	RMS
80099	7.1N	70.7W	122	MS	32	0	0	0	1.3	-6.5	6.6
82181	2.0S	54.1W	146	MS	88	0	0	0	0.8	5.1	5.2
82704	7.6S	72.7W	170	MS	87	1	1	1	1.4	-4.7	4.9
83235	12.4S	46.4W	604	MS	85	0	0	0	0.6	6.4	6.4
83332	14.1S	46.4W	826	MS	84	22	26	0	0.4	14.4	14.4
83470	17.9S	50.9W	727	MS	85	1	1	1	0.8	-5.3	5.4
83531	18.6S	46.5W	940	MS	87	0	0	0	0.6	-6.5	6.5
83836	25.5S	50.6W	837	MS	87	0	0	1	1.0	-5.4	5.5
84425	5.9S	76.1W	179	MS	87	0	0	0	1.2	4.2	4.4
84455	6.5S	76.4W	281	MS	85	0	0	0	1.1	6.7	6.8

WMO REGION 3:

STATION	LAT	LONG	HT(M)	RP	NOBS	NGE	PGE	%REJ	SD	BIAS	RMS
84472	7.1S	78.5W	2620	S	58	0	0	0	0.6	-5.5	5.5
84474	7.2S	76.7W	350	S	24	1	4	0	0.9	9.3	9.3
84686	13.6S	72.0W	3248	S	119	0	0	0	0.7	-4.6	4.7
84688	13.7S	73.4W	3444	S	50	0	0	0	0.4	-12.1	12.1
84720	14.9S	75.0W	567	MS	58	0	0	0	0.6	4.8	4.8
84782	18.1S	70.3W	468	MS	92	0	0	0	1.1	7.6	7.7
85140	14.3S	67.4W	140	MS	56	0	0	100	0.9	6.3	6.4
85264	18.5S	64.1W	1998	S	57	0	0	0	1.5	-11.1	11.2
85312	19.8S	63.9W	992	S	45	2	4	0	1.3	-11.9	12.0
85406	18.3S	70.3W	55	M	120	0	0	0	0.7	4.2	4.3
85432	22.5S	68.9W	2320	S8	78	0	0	3	1.5	4.8	5.0

WMO REGION 4:

STATION	LAT	LONG	HT(M)	RP	NOBS	NGE	PGE	%REJ	SD	BIAS	RMS
71048	61.6N	125.8W	610	S	118	0	0	1	1.4	4.7	4.9
71049	66.0N	91.8W	150	MS	117	106	91	0	0.6	13.4	13.4
71181	47.1N	55.3W	29	MS	120	0	0	0	0.8	-6.1	6.2
71475	49.3N	124.8W	2	MS	120	0	0	0	0.9	-8.3	8.3
71506	67.0N	136.2W	720	MS	117	0	0	0	1.2	-4.2	4.4
71599	44.4N	65.2W	127	MS	120	0	0	0	0.8	-4.2	4.3
76055	31.0N	114.9W	440	MS	62	62	100	0			
76543	22.0N	98.8W	104	MS	30	0	0	3	1.8	6.9	7.1
76658	19.2N	103.7W	494	MS	29	0	0	0	0.6	5.6	5.6
76683	19.3N	98.3W	2248	MS	70	1	1	0	0.8	4.1	4.2
76762	17.5N	99.5W	1265	MS	64	0	0	0	1.0	5.6	5.7
76773	17.8N	97.8W	1650	MS	27	1	4	0	1.0	4.0	4.1
76903	14.9N	92.3W	118	MS	82	0	0	0	0.8	6.0	6.1
78588	17.2N	87.5W	-80	M	120	100	83	0	0.5	0.2	0.5

WMO REGION 5:

STATION	LAT	LONG	HT(M)	RP	NOBS	NGE	PGE	%REJ	SD	BIAS	RMS
94130	14.8S	131.9E	120	MS	118	0	0	0	1.1	4.9	5.0
94541	29.8S	151.1E	584	MS	117	0	0	0	0.7	-9.2	9.2
96505	3.7N	115.7E	911	S8	40	39	98	0	0.0	9.4	9.4
97378	10.7S	123.1E	1	MS	24	23	96	13	0.0	-14.7	14.7
98553	11.6N	125.4E	6	M	117	0	0	3	1.0	-4.1	4.2

WMO REGION 6:

STATION	LAT	LONG	HT(M)	RP	NOBS	NGE	PGE	%REJ	SD	BIAS	RMS
01360	61.9N	7.9E	711	MS	117	0	0	1	1.0	6.9	7.0
01403	59.3N	4.9E	55	MS	278	0	0	32	1.6	-6.7	6.9
06685	47.0N	9.1E	515	MS	119	0	0	17	1.2	6.1	6.2
06780	46.8N	9.8E	2690	S7	119	0	0	3	0.8	4.0	4.1
08912	42.9N	0.8W	1434	MS	287	287	100	0			
08922	42.8N	0.2W	1660	MS	306	306	100	0			
10850	48.8N	10.7E	457	MS	360	0	0	0	0.5	-5.5	5.5
13269	44.3N	19.9E	176	MS	114	1	1	0	0.9	7.6	7.7
14554	44.9N	18.4E	136	S	58	6	10	0	1.4	-13.3	13.4
14650	43.8N	18.0E	970	S	58	0	0	28	0.8	-6.1	6.2
16344	39.3N	16.4E	1710	S8	34	0	0	0	1.6	4.7	5.0
16470	36.8N	12.0E	191	MS	74	0	0	0	0.7	-4.2	4.3
16538	40.1N	9.3E	1022	S	38	0	0	0	1.2	8.4	8.5
17088	40.5N	39.5E	1219	S8	118	0	0	0	1.3	4.8	5.0
17203	38.9N	40.5E	1177	S8	119	0	0	0	1.1	4.5	4.6

ANTARCTIC:

STATION	LAT	LONG	HT(M)	RP	NOBS	NGE	PGE	%REJ	SD	BIAS	RMS
89004	71.7S	2.8W	815	MS	90	0	0	0	1.6	-6.7	6.9
89253	63.2S	55.4W	75	M	209	0	0	1	1.9	4.7	5.1
89263	66.0S	66.1W	20	M	235	192	82	0	10.2	-3.8	10.9
89264	71.4S	68.9W	780	S	261	0	0	0	1.3	6.8	6.9
89272	75.0S	70.8W	1395	S	255	255	100	0			
89572	68.9S	78.0E	363	S	138	138	100	0			
89610	65.9S	113.1E	90	S	248	0	0	0	1.4	-8.0	8.1
89614	66.6S	111.2E	500	S	239	239	100	0			
89637	69.5S	130.0E	2560	S	122	84	69	0	1.5	11.6	11.7
89744	74.0S	43.1E	3353	S	274	0	0	0	0.8	7.3	7.3
89811	66.7S	112.8E	1366	S	251	0	0	0	1.3	-4.4	4.6

TABLE 4A

MONTHLY MONITORING OF AIRCRAFT OBSERVATIONS
MONITORING CENTRE: BRACKNELL
MONTH: April 2003

Monitoring procedures

Period :One calendar month.

Data monitored :Statistics for each airline carrier.

Area monitored :90°N - 90°S, 180°W - 180°E.

Standard of comparison :Background field from UKMO global model.

Observation times :All hours combined.

Level(s) monitored :300.0 - 150.0 hPa

Elements monitored :TEMP in °C ; WIND in m s^{-1}

Parameters monitored

:N REP. :Number of observations received excluding duplicates.

:PG :Percentage of observations with gross errors.

:PR :Percentage of observations rejected by quality control including rejections from the duplicate check.

:PC :Percentage of observations with calm winds.

:RMS :Root Mean Square difference of observations from background values excluding those with gross errors in Temperature & vector wind.

:BIAS :Mean difference of observations from background values excluding those with gross errors in Temperature & Wind Speed.

GROSS ERROR LIMITS :10.0 °C ; 60 m s^{-1} Vector Wind

SELECTION CRITERIA :N REP ≥ 20

NB: All American ACARS data are grouped together and statistics are shown at the bottom of the table as "US ACARS".

		TEMPERATURE						WIND			
IDENT.	N.REP.	PG	PR	RMS	BIAS	N.REP.	PG	PR	PC	RMS	BIAS
AAH	3019	0	40	1.6	0.0	2986	0	40	0	6.4	-0.1
AAL	5977	1	36	1.6	0.0	5803	0	36	0	6.1	-0.1
AAR	1275	0	6	1.8	-0.5	1275	0	7	0	8.2	0.3
ACA	2817	0	10	1.5	-0.1	2624	0	11	0	7.1	0.2
ACI	79	0	39	1.9	0.5	80	0	38	0	6.4	-0.2
AEA	893	1	4	1.5	0.4	494	0	3	0	7.3	0.6
AEL	833	1	9	1.6	-0.3	689	0	11	0	7.9	1.0
AEW	30	0	0	1.2	-0.4	30	0	7	0	11.1	0.0
AFL	445	0	4	1.8	0.4	401	1	5	0	8.1	0.5
AFR	1885	0	4	1.5	0.1	1467	0	6	0	7.2	0.7
AIS	450	1	7	1.8	-0.6	413	1	8	0	8.6	0.3
AJM	426	0	3	1.6	-0.3	358	0	2	0	6.2	0.7
AJX	267	1	4	1.8	0.8	264	0	5	0	7.5	0.0
AMM	90	0	6	1.4	0.1	68	0	6	0	8.0	0.2
AMT	1441	1	41	1.3	0.1	1438	0	41	0	5.3	-0.4
AMX	258	2	5	1.4	0.0	199	0	4	0	8.4	0.2
ANA	38	0	5	1.5	-0.1	39	0	8	0	5.9	0.2
ANZ	4725	0	27	1.3	0.3	4703	0	27	0	6.4	0.8
ATN	45	0	100	4.2	-3.0	45	0	36	0	11.7	1.3
AVA	293	0	3	2.1	1.0	173	0	3	0	7.8	1.0
AVN	138	0	49	1.1	-0.1	138	0	49	0	5.1	-0.1
AXF	35	0	40	0.6	0.0	35	0	40	0	6.9	3.1
AZA	425	1	10	2.4	0.4	367	1	8	0	7.2	-0.1
BAF	32	0	0	1.5	-0.8	32	0	0	0	4.7	0.7
BAL	113	1	5	1.4	-0.4	90	0	4	0	5.1	0.9
BAW	884	0	8	1.7	-0.4	825	0	8	0	7.2	0.3
BBR	191	1	5	1.4	0.5	118	0	61	0	10.8	-0.1
BHP	31	3	10	1.6	-1.1	30	0	13	0	9.8	2.5
BPA	161	0	51	1.4	-0.3	133	0	9	0	10.0	0.7
BSK	30	0	23	1.3	-0.1	30	0	33	0	10.8	-0.4
BWA	372	1	5	1.6	-0.2	267	0	6	0	8.3	0.2
CAL	79	0	4	2.0	0.1	79	0	5	0	9.8	1.0
CCA	176	0	10	2.2	0.4	188	1	63	0	12.1	-0.8
CES	294	2	8	1.6	0.3	300	1	8	0	7.9	0.6
CFC	43	0	7	1.9	0.1	41	0	10	0	8.5	1.2
CFG	1099	1	6	1.6	-0.7	986	0	6	0	7.2	0.5
CGA	149	0	0	1.2	-0.5	141	0	0	0	4.0	0.5
CGF	50	0	2	1.3	-0.6	49	0	2	0	4.4	0.7
CGH	170	0	2	1.3	-0.3	159	0	1	0	4.1	0.9
CKK	63	0	2	1.6	0.4	63	3	8	0	8.8	0.4
CKS	409	0	35	1.4	-0.1	407	0	35	0	5.9	0.2
CLX	417	1	3	1.5	-0.4	348	0	5	0	6.8	0.4
COA	399	2	39	1.4	-0.2	362	0	39	0	6.0	0.2
CRL	823	1	4	1.6	0.2	615	0	4	0	7.7	0.4
CSN	93	0	8	1.9	-0.3	92	0	8	0	6.9	1.3
CUB	226	0	3	1.8	0.5	172	0	51	0	7.6	0.1
DAB	438	0	12	1.4	-0.4	408	0	13	0	4.2	0.6
DAI	345	0	5	1.3	0.1	319	0	5	0	4.2	0.8
DAL	2415	0	42	1.3	-0.2	2357	0	43	0	6.1	0.0
DBR	33	0	0	1.4	-0.3	32	0	0	0	5.9	0.2
DCE	169	1	4	1.2	-0.5	147	0	5	0	7.3	0.7
DCS	22	0	0	1.7	-0.9	23	0	4	0	7.3	0.6
DHL	123	0	100	6.3	-6.0	122	0	32	0	15.8	3.8
DLH	1242	0	15	1.6	-0.2	1107	0	16	0	6.0	0.7
EDW	105	1	4	1.5	-0.2	94	0	4	0	5.4	1.1
EEZ	62	3	8	1.8	-0.3	53	0	6	0	6.7	0.6
EIA	296	1	100	2.4	1.3	284	0	100	0	16.9	4.3
ELY	128	0	2	1.8	-0.4	116	0	1	0	6.2	0.8
EVA	103	0	4	1.8	-0.3	116	0	6	0	8.1	-0.2

		TEMPERATURE				WIND					
IDENT.	N.REP.	PG	PR	RMS	BIAS	N.REP.	PG	PR	PC	RMS	BIAS
FDX	2188	1	41	1.3	0.2	2190	0	41	0	6.6	0.5
FGS	186	0	2	1.5	0.4	169	0	1	0	4.0	1.1
FGZ	30	0	3	1.0	-0.3	30	0	3	0	3.4	1.2
FIN	190	1	5	1.5	0.0	185	0	4	0	5.6	0.2
FJI	843	1	49	1.7	0.9	828	0	48	0	8.2	0.2
FLC	41	0	24	1.5	0.6	41	0	24	0	8.2	1.0
FOM	739	0	33	1.4	0.2	735	0	33	0	6.8	0.6
FWQ	46	0	50	1.9	0.4	46	0	50	0	11.9	-1.2
GAF	39	3	10	1.9	-0.8	35	3	9	0	9.0	0.8
GCO	504	0	9	1.5	-0.1	510	0	58	0	11.1	2.5
GHA	26	0	4	2.0	0.5	20	0	0	0	5.7	0.8
GOJ	86	0	0	1.2	0.0	81	0	0	0	4.1	1.0
GRL	88	0	0	1.2	0.0	84	0	4	0	7.4	1.4
GTI	312	1	14	1.9	0.1	308	0	12	0	7.6	0.2
GVA	62	0	3	1.1	0.2	58	0	3	0	4.0	0.0
GVB	27	0	0	1.1	0.5	26	0	0	0	4.3	0.8
GVF	37	22	46	4.9	2.1	36	0	0	0	5.7	1.3
GVG	49	0	0	1.1	-0.2	44	0	0	0	4.9	0.2
GVH	44	0	0	1.2	-0.4	41	0	0	0	4.2	-0.4
GVL	66	0	3	1.3	0.0	65	0	3	0	5.0	0.6
GVR	139	0	1	1.5	-0.3	134	0	1	0	5.1	0.7
GVT	50	0	6	1.5	-0.6	43	0	5	0	4.6	1.1
GVW	47	0	2	1.2	-0.4	44	0	2	0	4.6	0.8
GVX	60	0	3	1.1	0.1	55	0	4	0	3.7	0.4
GWW	67	0	6	1.2	-0.3	64	0	6	0	4.3	1.1
GYM	26	0	0	0.7	0.4	22	0	0	0	3.7	0.0
HAL	4904	0	39	1.2	-0.2	4862	0	40	0	6.7	0.1
HRH	111	1	59	1.3	0.6	111	0	59	0	6.5	1.6
IBE	3161	1	7	2.0	0.6	2102	1	6	0	7.9	0.4
ICE	753	0	3	1.3	-0.2	730	1	5	0	7.0	0.7
IWD	292	1	4	1.7	-0.1	191	0	2	0	6.9	0.8
JAA	174	2	9	2.1	1.4	170	0	5	0	6.4	1.9
JAL	2384	0	4	1.7	0.4	2374	0	5	0	8.0	0.2
JAZ	1036	0	4	1.7	0.8	1035	0	4	0	7.8	0.1
JBU	48	0	0	1.4	0.1	49	2	2	0	5.6	0.6
KAI	28	0	43	2.9	1.6	28	0	43	0	6.2	2.3
KAL	2497	1	10	1.8	0.0	2503	0	9	0	8.0	0.5
KLM	1950	0	6	1.6	0.1	1657	0	7	0	6.6	0.6
LAN	526	0	5	1.5	-0.2	523	1	5	0	6.7	1.1
LAP	77	0	48	3.0	1.6	75	0	51	0	10.4	0.6
LDI	667	1	3	1.8	-0.8	491	0	3	0	7.0	0.1
LOT	132	1	6	2.1	-1.3	132	0	5	0	6.6	0.3
LTU	898	1	4	1.4	-0.2	767	0	3	0	6.3	0.4
LXR	39	5	10	1.9	0.7	27	0	7	0	12.9	3.0
MAS	330	1	10	2.0	-0.1	330	0	7	0	7.6	0.6
MON	64	0	2	1.2	-0.2	51	0	2	0	6.0	1.2
MPD	410	1	4	1.7	0.4	268	0	4	0	7.2	1.1
MPH	629	0	4	1.9	-0.9	584	0	4	0	7.1	0.6
MYT	325	1	3	1.8	0.2	281	0	4	0	7.2	0.3
NAO	286	1	37	1.4	-0.4	286	0	39	0	7.8	-1.1
NCA	1068	0	3	1.4	0.1	812	0	4	0	6.9	0.0
NWA	8445	0	11	1.6	0.1	8425	0	11	0	7.1	0.2
NZL	3115	0	9	1.2	0.3	3115	0	10	0	4.8	0.6
OAE	572	1	38	1.5	-0.2	574	0	74	0	8.6	0.8
PAC	612	0	14	1.7	0.0	604	0	13	0	6.7	0.5
PAL	1314	0	8	1.4	-0.2	1284	0	9	0	7.7	0.7
PAO	366	0	58	1.6	0.3	364	1	58	0	7.4	0.4
PUA	26	0	46	3.1	0.9	23	0	57	0	21.9	1.5
QFA	3293	0	53	1.2	0.4	3283	0	53	0	5.7	0.5

		TEMPERATURE						WIND			
IDENT.	N.REP.	PG	PR	RMS	BIAS	N.REP.	PG	PR	PC	RMS	BIAS
RAM	206	0	4	1.5	0.2	126	2	65	0	10.3	0.8
RCH	593	1	20	2.6	0.4	505	0	100	0	10.2	0.9
RJA	28	0	0	1.3	0.3	28	0	0	0	4.9	-0.2
ROM	21	0	5	1.5	-1.0	21	0	5	0	12.4	0.2
RZO	428	2	5	1.6	-0.4	182	0	3	0	9.0	-0.1
SAA	335	2	3	1.6	-0.8	267	0	4	0	8.2	0.6
SEU	165	1	5	1.9	0.3	153	1	3	0	8.1	0.3
SIA	262	0	1	1.4	0.3	264	0	2	0	5.2	-0.3
SLR	303	1	8	1.4	-0.3	289	0	9	0	8.3	0.6
SOO	20	0	20	1.7	1.4	20	0	20	0	5.3	0.2
SQC	55	0	2	1.6	0.6	55	0	4	0	7.2	-0.6
SSV	29	0	7	1.3	0.0	25	0	4	0	5.8	0.0
SVA	26	4	8	1.8	-0.4	26	0	8	0	11.1	2.1
TAG	57	0	44	2.6	1.8	51	0	43	0	5.6	0.5
TAM	70	3	16	2.2	-0.1	70	0	20	0	13.4	-0.9
TAP	564	1	5	1.6	-0.3	222	0	7	0	7.8	0.0
TCV	34	3	6	1.5	1.2	24	4	8	0	4.8	1.2
TCX	142	1	4	1.4	0.2	120	0	3	0	7.3	0.7
THA	103	0	5	1.8	0.5	105	0	2	0	5.3	0.7
THT	127	1	29	1.4	0.0	116	0	28	0	8.4	0.2
TPA	35	0	0	1.0	0.3	25	0	4	0	9.8	-0.3
TSC	51	0	8	2.0	-0.1	47	0	13	0	11.9	2.4
UAL	140252	0	93	1.1	-0.3	140392	0	93	0	4.9	0.3
UPS	1884	0	53	1.4	-0.1	1863	0	54	0	6.5	0.2
USA	177	1	3	1.5	-0.5	151	1	3	0	6.7	0.5
VIR	197	1	5	1.3	-0.3	178	0	4	0	8.1	0.7
VPB	38	0	18	1.7	0.1	35	0	26	0	8.4	0.9
VRG	181	6	23	1.9	0.9	177	1	71	0	12.5	-0.1
VVJ	34	3	29	1.0	-0.4	39	0	28	0	9.4	1.4
VVR	24	0	29	1.9	0.9	21	0	33	0	4.7	2.2
WOA	634	0	12	1.4	0.2	621	0	15	0	8.8	0.7
YSS	184	0	6	1.7	0.7	136	1	7	0	8.5	-0.2
ZKN	31	0	0	1.4	-0.7	27	0	0	0	4.4	1.0
9VS	152	0	1	1.3	-0.2	144	0	1	0	4.3	0.1
AR	2147	0	100	3.0	2.7	2143	0	6	0	5.9	0.6
AU	41754	0	10	1.2	0.5	41757	0	10	0	5.2	0.5
EU	183517	0	25	1.3	0.2	183516	0	25	0	4.6	0.5
KL	3733	0	6	1.3	0.6	3723	0	6	0	5.9	0.6
LH	153	0	48	1.6	1.1	153	0	49	0	5.0	-0.1
MK	3846	0	72	1.8	1.5	3820	0	7	0	6.1	1.4
SA	1746	0	7	1.9	1.6	1740	0	6	0	5.9	1.0
SV	870	0	100	2.0	1.8	848	0	100	0	9.4	2.6
N	3061	1	20	1.6	0.1	2931	0	20	0	5.8	0.7
US ACARS	880292	0	62	1.3	0.3	880265	0	61	0	5.3	0.4

TABLE 4B

MONTHLY MONITORING OF AIRCRAFT OBSERVATIONS
MONITORING CENTRE: BRACKNELL
MONTH: April 2003

Monitoring procedures

Period :One calendar month.

Data monitored :Statistics for each airline carrier.

Area monitored :90°N - 90°S, 180°W - 180°E.

Standard of comparison :Background field from UKMO global model.

Observation times :All hours combined.

Level(s) monitored :1000.0 – 300.1 hPa

Elements monitored :TEMP in °C ; WIND in m s^{-1}

Parameters monitored

:N REP. :Number of observations received excluding duplicates.

:PG :Percentage of observations with gross errors.

:PR :Percentage of observations rejected by quality control including rejections from the duplicate check.

:PC :Percentage of observations with calm winds.

:RMS :Root Mean Square difference of observations from background values excluding those with gross errors in Temperature & vector wind.

:BIAS :Mean difference of observations from background values excluding those with gross errors in Temperature & Wind Speed.

GROSS ERROR LIMITS :10.0 °C ; 60 m s^{-1} Vector Wind

SELECTION CRITERIA :N REP $\geq$ 20

NB : All American ACARS data are grouped together and statistics are shown at the bottom of the table as "US ACARS".

	TEMPERATURE					WIND					
IDENT.	N.REP.	PG	PR	RMS	BIAS	N.REP.	PG	PR	PC	RMS	BIAS
AAH	20	5	40	2.1	-0.3	20	0	35	0	6.9	2.7
AAL	474	1	38	1.2	-0.2	468	0	38	0	6.7	0.9
ACA	24	0	13	0.9	0.2	24	0	13	0	4.9	1.4
AFR	143	2	5	1.5	0.1	126	0	4	0	7.2	0.9
AMT	32	0	34	0.8	-0.2	32	0	34	0	4.1	0.0
ANZ	212	1	28	1.1	-0.2	214	0	27	0	5.4	0.3
APW	36	3	3	2.5	-2.2	38	0	16	0	13.8	-0.4
ATN	42	0	100	4.3	-2.6	44	0	20	0	9.9	3.2
AXF	35	0	63	1.4	-0.4	35	0	63	0	4.5	0.4
BAF	68	19	28	3.0	0.7	66	2	9	0	9.3	0.1
CFC	77	1	6	1.1	0.3	60	0	15	0	9.1	-0.5
CFG	53	0	8	1.7	-1.1	46	0	7	0	9.7	0.9
CKS	60	0	12	1.7	0.7	60	2	20	0	9.3	0.7
COA	28	0	39	0.6	-0.3	28	0	43	0	8.9	0.0
DAL	200	0	51	1.9	-0.5	195	0	48	0	5.7	1.6
DHL	55	0	100	6.6	-6.5	57	0	21	0	14.2	2.5
DLH	202	2	11	1.3	-0.3	194	0	13	0	7.3	0.9
EIA	48	0	100	1.9	0.5	48	0	100	0	21.9	13.0
FDX	421	1	29	1.4	0.0	422	0	27	0	6.6	0.7
GAF	23	0	0	1.2	0.2	22	0	0	0	4.7	0.2
GCO	224	0	5	1.3	0.0	229	0	67	0	15.4	2.3
GTI	39	0	3	1.3	-0.5	36	0	8	0	6.6	1.1
HAL	173	0	42	2.0	-0.9	167	0	40	0	7.2	-0.1
IBE	46	0	2	1.4	0.2	37	0	3	0	5.1	0.2
ICE	26	0	0	2.2	-1.5	25	0	0	0	4.2	1.0
JAA	57	2	2	1.3	0.5	57	0	2	0	6.9	1.1
JAL	43	0	5	1.7	0.0	43	0	2	0	6.3	0.4
JAZ	117	1	3	1.5	0.8	119	0	5	0	7.2	-0.2
KAL	26	0	12	1.5	-0.1	27	0	11	0	5.8	-0.8
KIW	42	21	48	2.4	2.0	39	0	38	0	5.8	0.3
KLM	58	0	5	1.3	-0.3	46	0	7	0	9.4	1.9
MPH	68	0	4	1.5	-0.8	65	0	3	0	6.7	0.5
NCA	75	0	0	1.2	0.0	59	0	2	0	7.6	-0.2
NWA	210	1	18	1.4	-0.2	207	0	16	0	7.0	0.1
NZL	15472	0	53	1.3	0.5	15472	0	53	0	4.3	0.3
OAE	43	0	28	1.7	-0.4	40	0	68	0	13.7	2.0
PAL	45	0	22	1.2	-0.9	41	0	24	0	9.8	2.2
QFA	240	0	56	1.0	0.0	243	0	56	0	5.7	0.7
RCH	129	3	30	3.5	-1.2	102	0	100	0	10.4	1.5
RRR	49	2	24	4.0	2.9	47	0	19	0	11.3	-1.0
SAA	56	2	5	1.3	-1.1	56	0	7	0	10.9	-0.7
SIA	48	0	2	1.0	0.2	50	0	2	0	3.8	0.8
TOT	21	5	33	3.1	1.3	21	0	24	0	6.5	1.9
UAL	300977	0	99	1.2	-0.1	300656	0	99	0	4.5	0.3
UPS	292	0	52	1.5	-0.1	278	0	53	0	7.2	-0.1
WOA	203	1	10	1.2	0.1	198	0	16	0	8.3	1.3
AR	1242	0	100	2.0	1.6	1228	0	45	0	4.6	0.9
AU	29819	0	50	1.0	0.3	29890	0	50	0	4.0	0.1
EU	654321	0	69	1.1	0.2	650963	0	69	0	3.9	0.0
KL	2453	0	56	1.8	0.9	2444	0	56	0	4.9	0.1
LH	30	0	93	1.1	0.8	30	0	93	0	2.7	0.0
MK	2263	0	88	1.6	1.0	2249	0	53	0	4.7	0.5
SA	664	0	56	1.9	1.5	664	0	55	0	4.2	0.6
SV	670	0	100	3.5	3.1	665	0	100	0	10.7	3.0
N	44	2	20	2.5	-0.5	43	0	12	0	8.6	1.7
US ACARS	1690501	0	78	1.3	0.4	1684714	0	78	0	4.4	0.2

Figure 3a. AIRCRAFT 300 - 150 hPa mean daily count. APRIL 2003
Observations with O-B vector difference greater than 60 ms-1 excluded
Global average number of observations in 24 hours = 44900

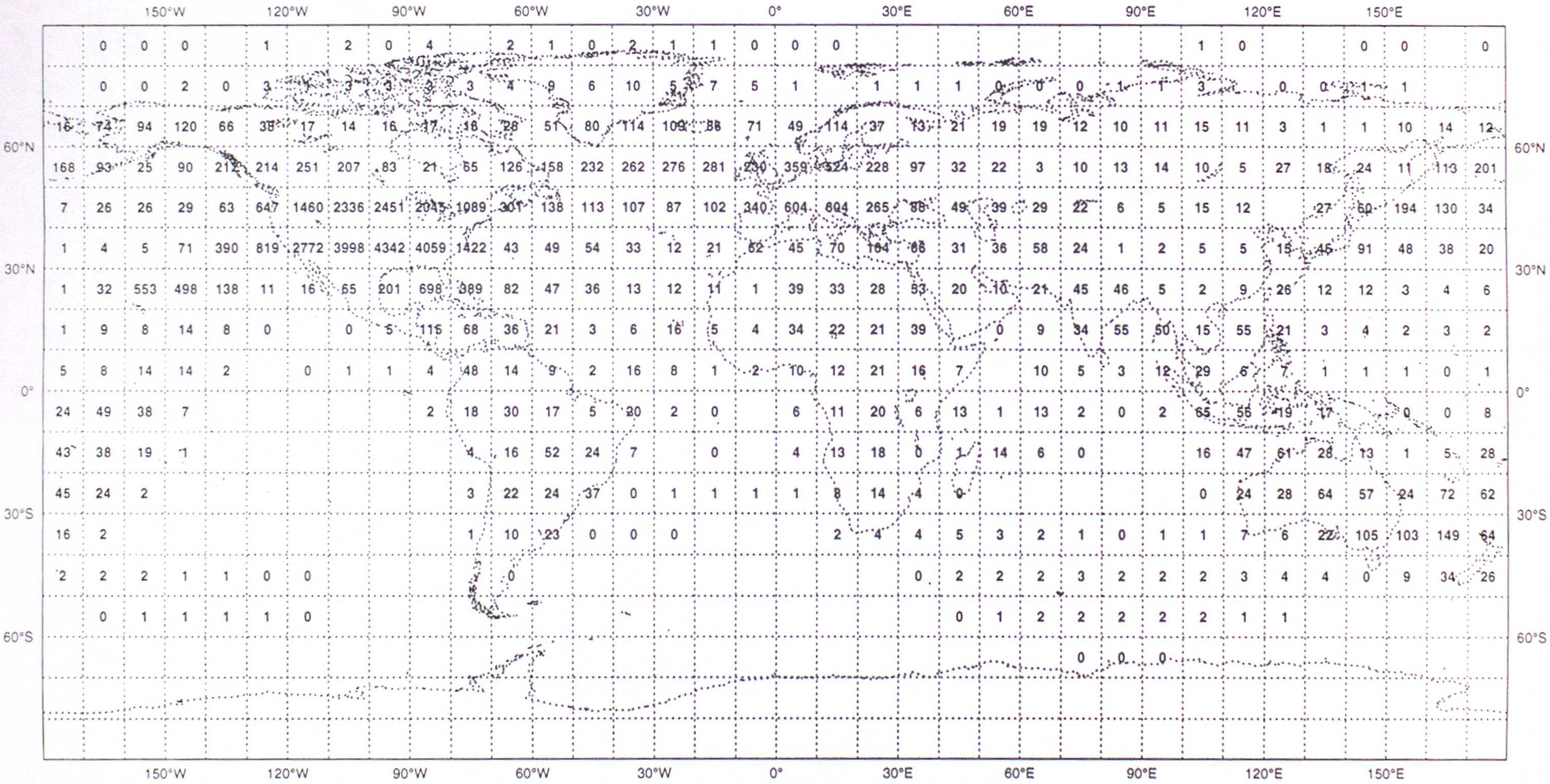

150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S

Figure 3b. AIRCRAFT 1000 - 301 hPa mean daily count. APRIL 2003
Observations with O-B vector difference greater than 60 ms-1 excluded
Global average number of observations in 24 hours = 89788

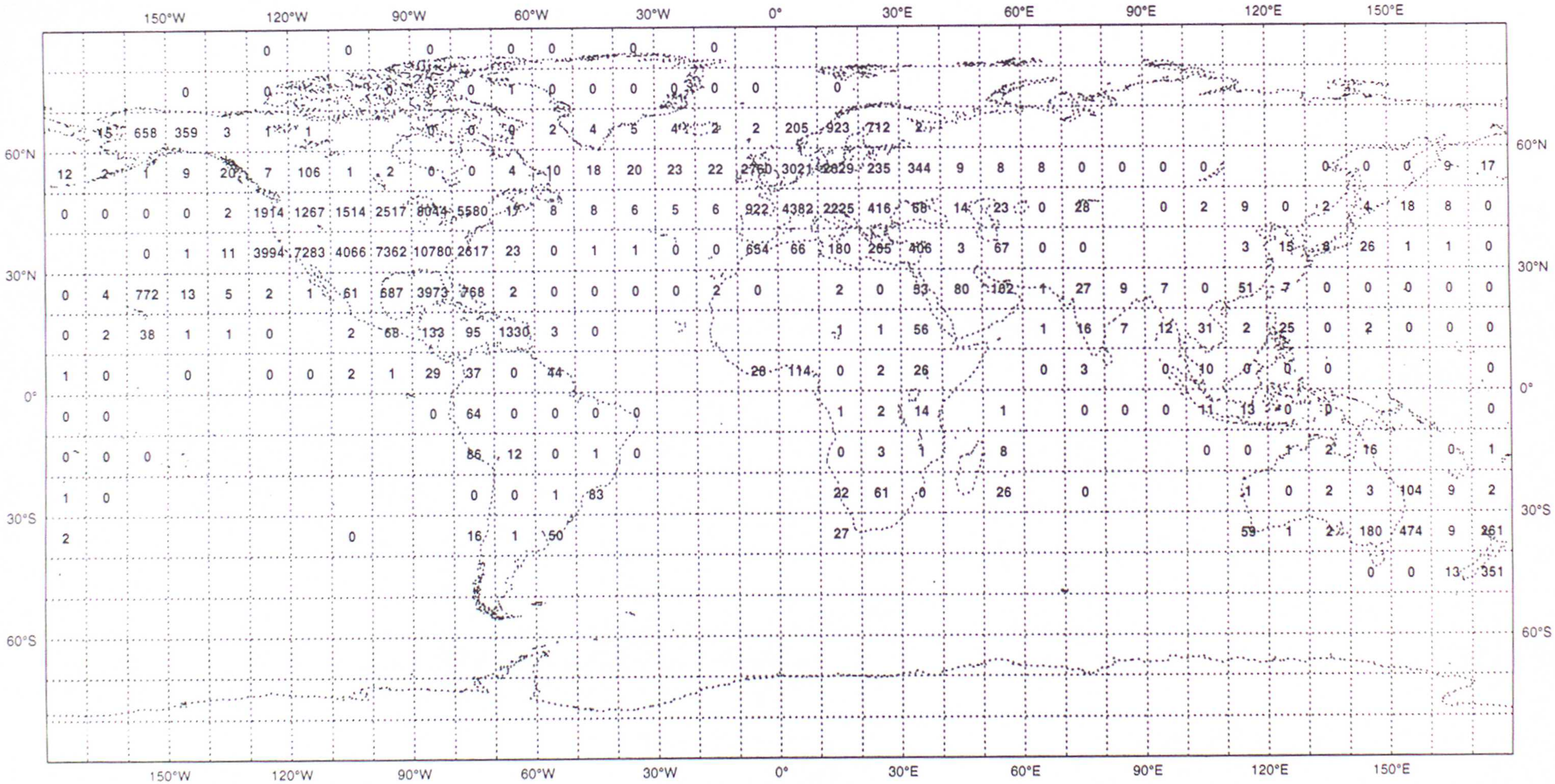
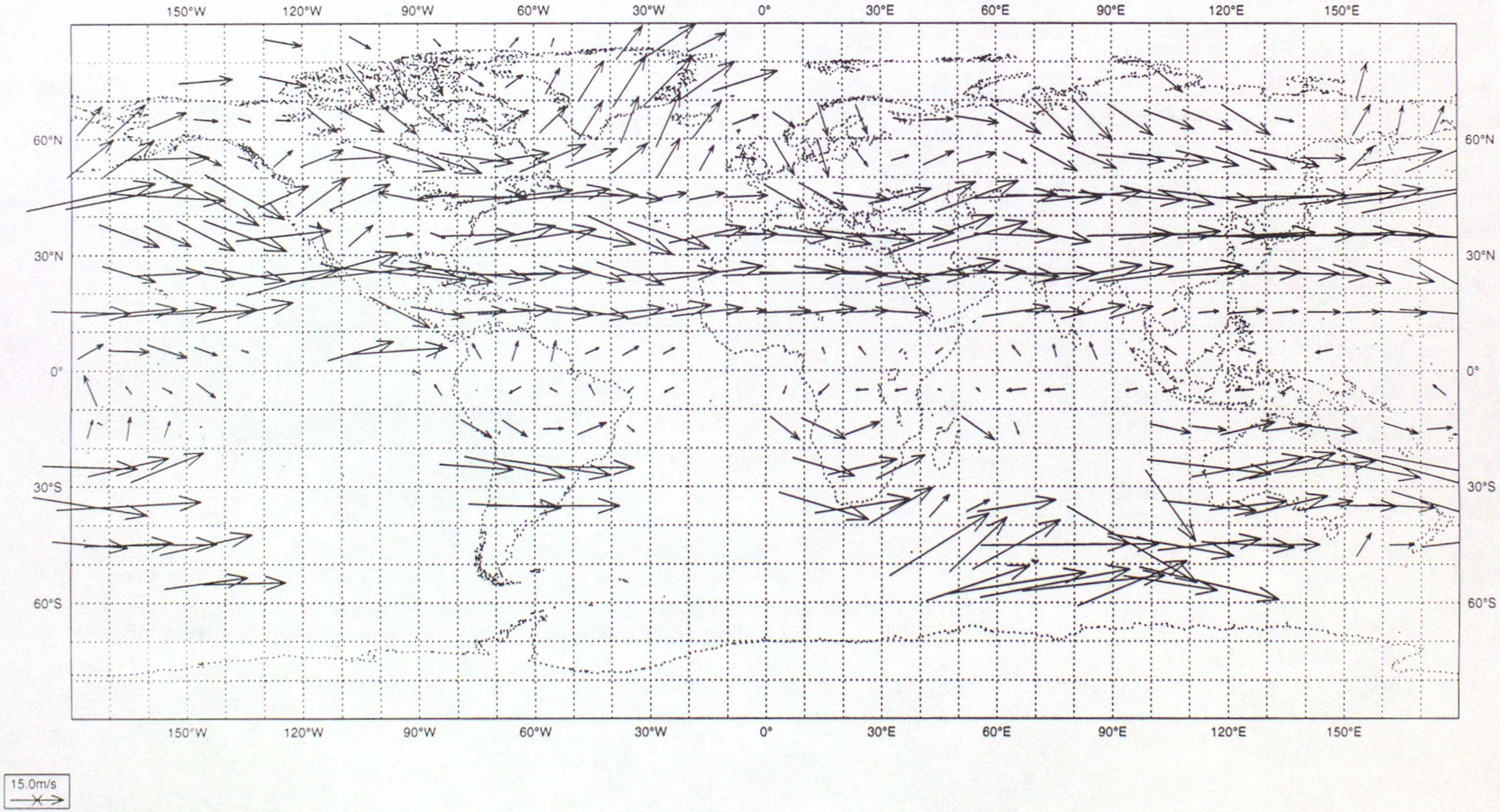

150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S
0 0 0 0 0 0 0
0 0 0 0 0 1 0 0 0 0 0 0 0
15 658 359 3 1 1 0 0 9 2 4 5 4 2 2 205 923 712 2
12 2 1 9 20 7 106 1 2 0 0 4 10 18 20 23 22 2760 3021 2829 235 344 9 8 8 0 0 0 0 0 0 0 9 17
0 0 0 0 2 1914 1267 1514 2517 8044 5580 17 8 8 6 5 6 922 4382 2225 416 68 14 23 0 28 0 2 9 0 2 4 18 8 0
0 1 11 3994 7283 4066 7362 10780 2617 23 0 1 1 0 0 654 66 180 265 406 3 67 0 0 3 15 8 26 1 1 0
0 4 772 13 5 2 1 61 687 3973 768 2 0 0 0 0 2 0 2 0 53 80 182 1 27 9 7 0 51 7 0 0 0 0 0
0 2 38 1 1 0 2 68 133 95 1330 3 0 1 1 56 1 16 7 12 31 2 25 0 2 0 0 0
1 0 0 0 0 2 1 29 37 0 44 28 114 0 2 26 0 3 0 10 0 0 0 0
0 0 0 64 0 0 0 0 1 2 14 1 0 0 0 11 13 0 0 0
0 0 0 86 12 0 1 0 0 3 1 8 0 0 1 2 16 0 1
1 0 0 0 1 83 22 61 0 26 0 1 0 2 3 104 9 2
2 0 16 1 50 27 59 1 2 180 474 9 261
0 0 13 351

Figure 4a. AIRCRAFT 300 - 150 hPa mean winds. APRIL 2003
Observations with O-B vector difference greater than 60 ms-1 excluded
Arrows are plotted where greater than 30 obs are present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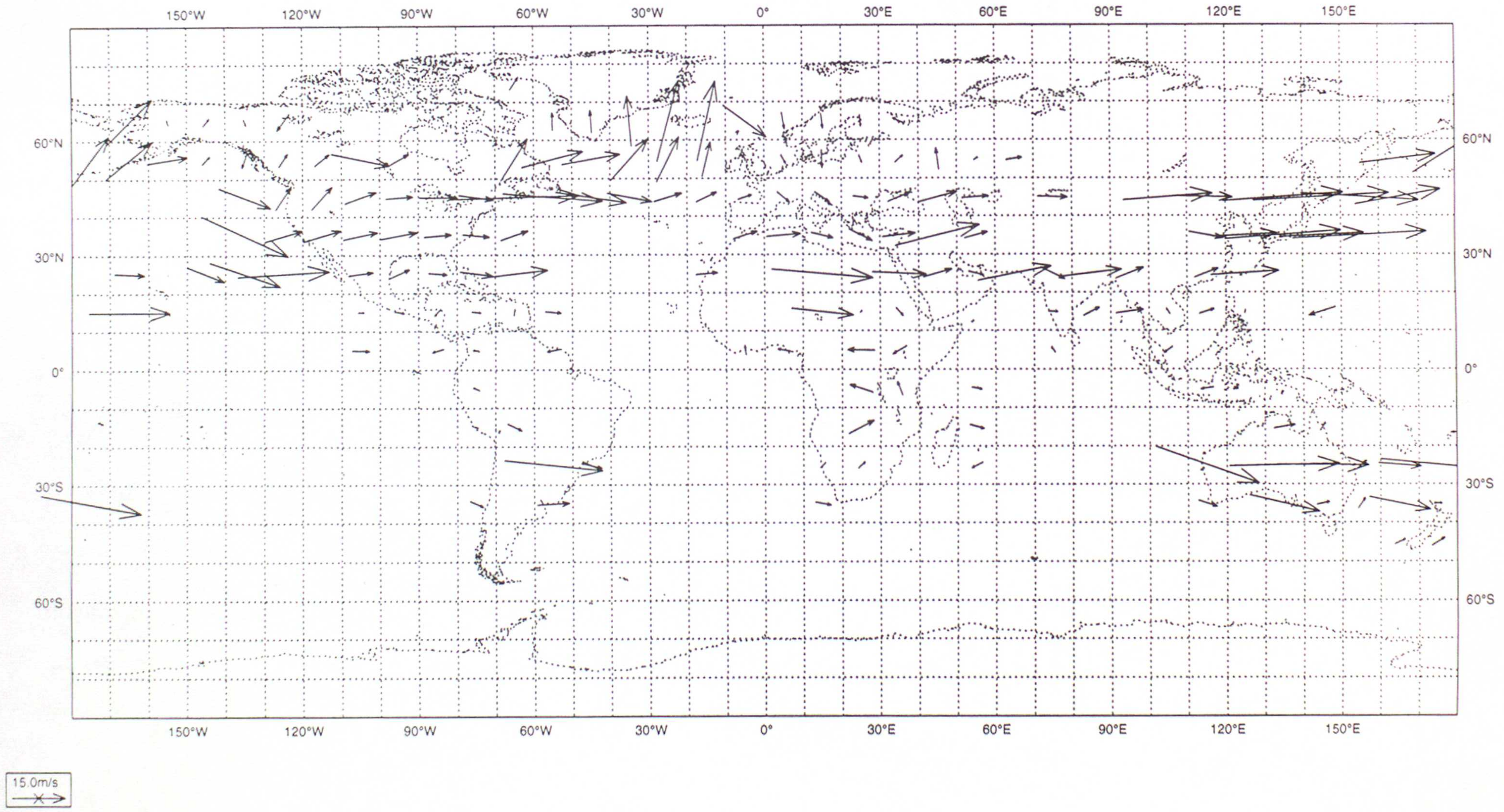
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S
15.0m/s

Figure 4b. AIRCRAFT 1000 - 301 hPa mean winds. APRIL 2003
Observations with O-B vector difference greater than 60 ms-1 excluded
Arrows are plotted where greater than 30 obs are present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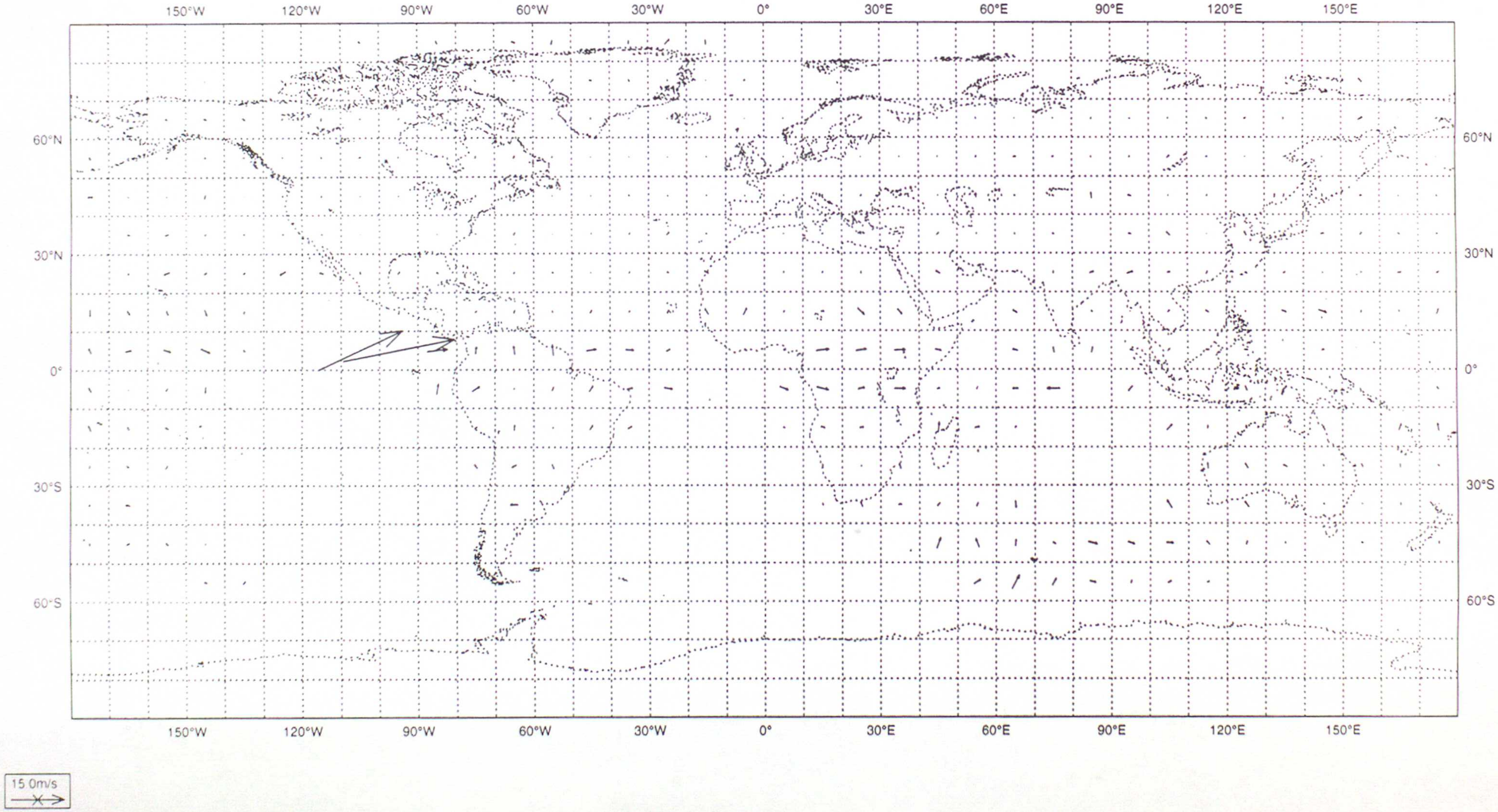
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S
15.0m/s

Figure 5a. AIRCRAFT 300 - 150 hPa mean O-B winds. APRIL 2003
Observations with O-B vector difference greater than 60 ms-1 excluded
Arrows are plotted where greater than 30 obs are present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120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S
15.0m/s

Figure 5b. AIRCRAFT 1000 - 301 hPa mean O-B winds. APRIL 2003
Observations with O-B vector difference greater than 60 ms-1 excluded
Arrows are plotted where greater than 30 obs are present

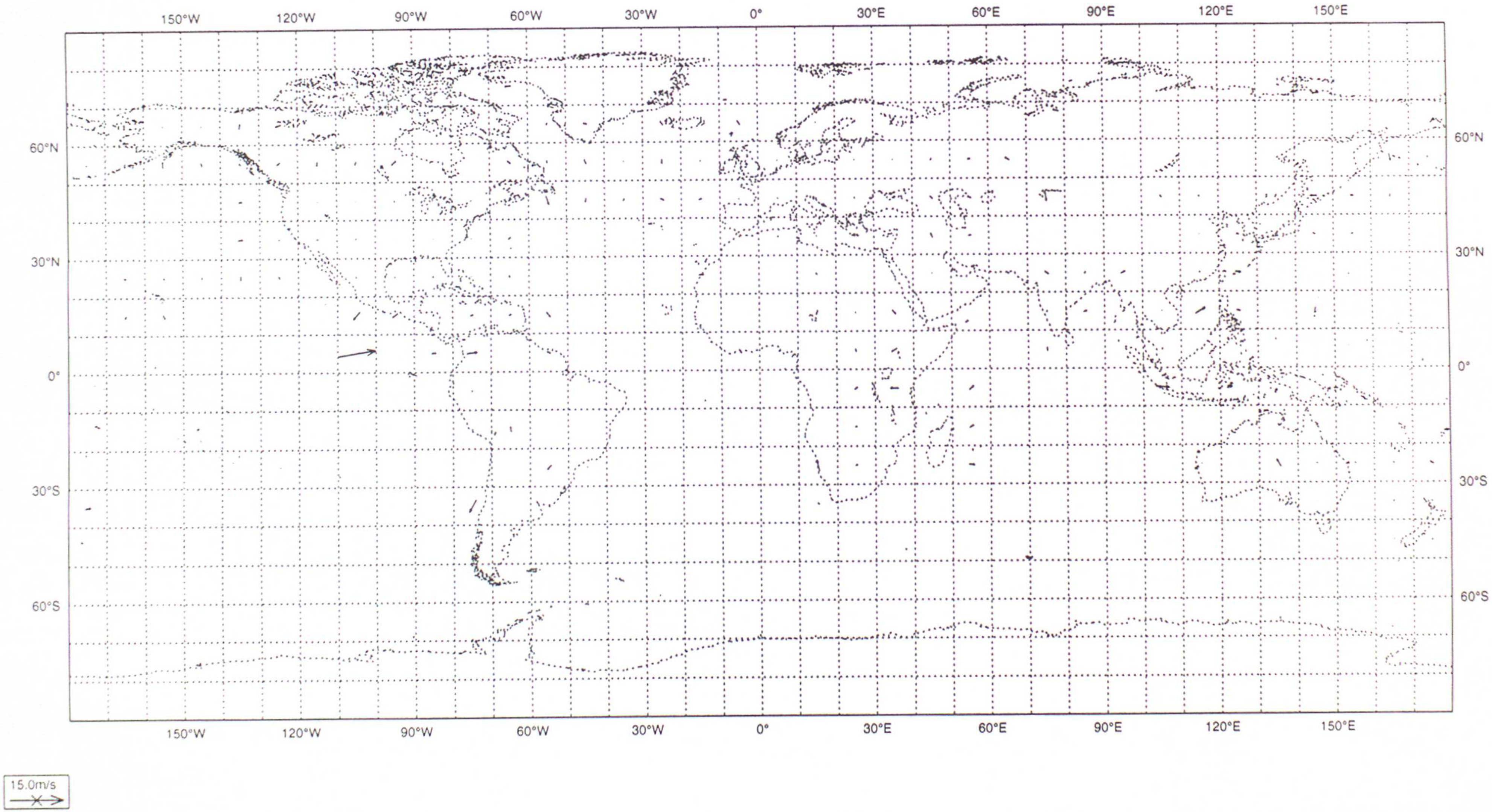

150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S
15.0m/s

Figure 6a. AIRCRAFT 300 - 150 hPa mean O-B speeds (ms-1). APRIL 2003
Observations with O-B vector difference greater than 60 ms-1 excluded
Values are printed where greater than 30 obs are present

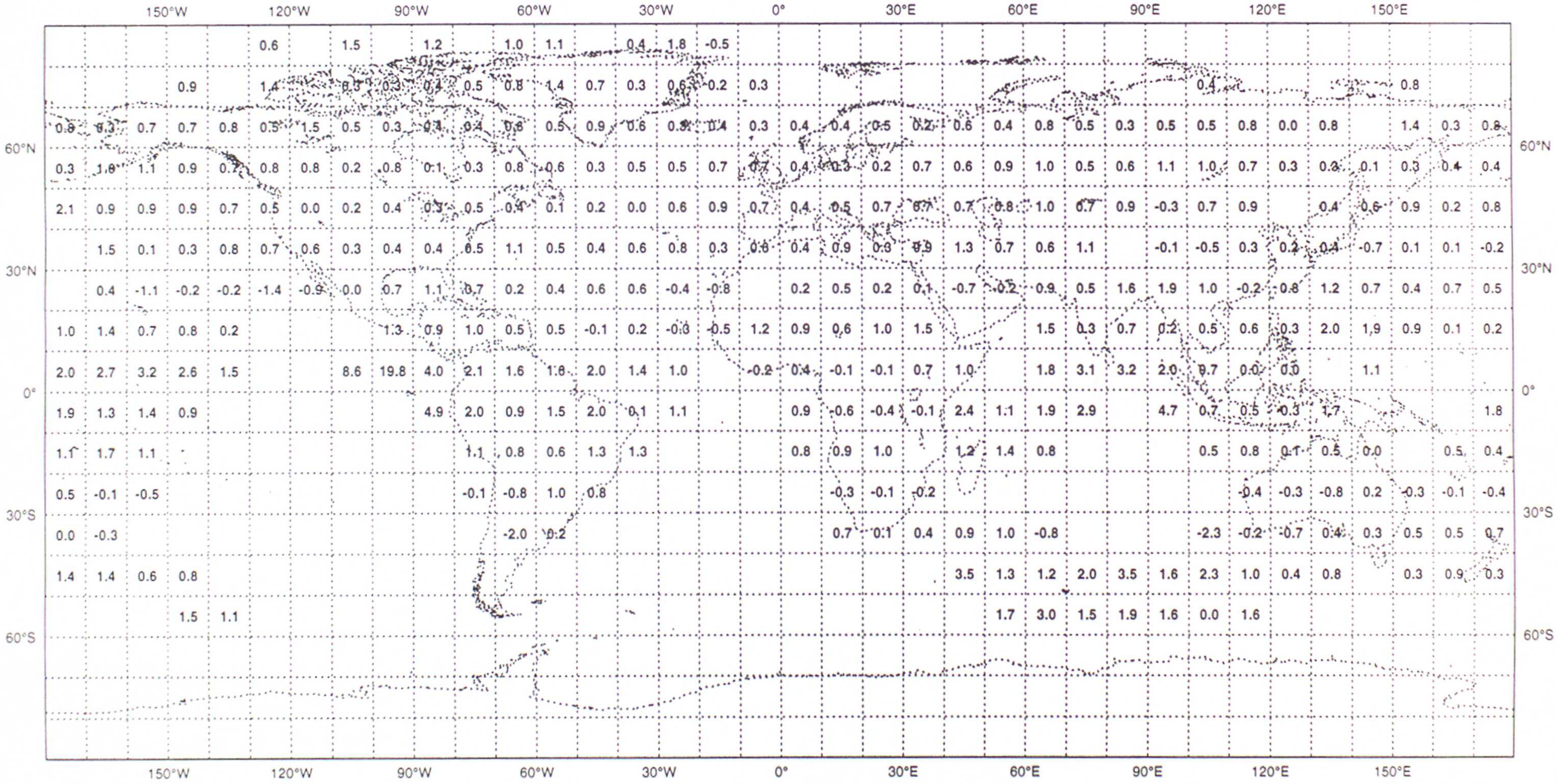

150°W 120°W 90°W 60°W 30°W 0° 30°E 60°E 90°E 120°E 150°E
60°N 30°N 0° 30°S 60°S
0.6 1.5 1.2 1.0 1.1 0.4 1.8 -0.5
0.9 1.4 0.3 0.3 0.4 0.5 0.8 1.4 0.7 0.3 0.6 -0.2 0.3 0.4 0.8
0.9 0.3 0.7 0.7 0.8 0.5 1.5 0.5 0.3 0.4 0.4 0.6 0.5 0.9 0.6 0.8 0.4 0.3 0.4 0.4 0.5 0.2 0.6 0.4 0.8 0.5 0.3 0.5 0.5 0.8 0.0 0.8 1.4 0.3 0.8
0.3 1.8 1.1 0.9 0.7 0.8 0.8 0.2 0.8 0.1 0.3 0.8 0.6 0.3 0.5 0.5 0.7 0.7 0.4 0.3 0.2 0.7 0.6 0.9 1.0 0.5 0.6 1.1 1.0 0.7 0.3 0.3 0.1 0.3 0.4 0.4
2.1 0.9 0.9 0.9 0.7 0.5 0.0 0.2 0.4 0.3 0.5 0.4 0.1 0.2 0.0 0.6 0.9 0.7 0.4 0.5 0.7 0.7 0.7 0.8 1.0 0.7 0.9 -0.3 0.7 0.9 0.4 0.6 0.9 0.2 0.8
1.5 0.1 0.3 0.8 0.7 0.6 0.3 0.4 0.4 0.5 1.1 0.5 0.4 0.6 0.8 0.3 0.8 0.4 0.9 0.9 0.9 1.3 0.7 0.6 1.1 -0.1 -0.5 0.3 0.2 0.4 -0.7 0.1 0.1 -0.2
0.4 -1.1 -0.2 -0.2 -1.4 -0.9 0.0 0.7 1.1 0.7 0.2 0.4 0.6 0.6 -0.4 -0.8 0.2 0.5 0.2 0.1 -0.7 -0.2 0.9 0.5 1.6 1.9 1.0 -0.2 0.8 1.2 0.7 0.4 0.7 0.5
1.0 1.4 0.7 0.8 0.2 1.3 0.9 1.0 0.5 0.5 -0.1 0.2 -0.3 -0.5 1.2 0.9 0.6 1.0 1.5 1.5 0.3 0.7 0.2 0.5 0.6 0.3 2.0 1.9 0.9 0.1 0.2
2.0 2.7 3.2 2.6 1.5 8.6 19.8 4.0 2.1 1.6 1.8 2.0 1.4 1.0 -0.2 0.4 -0.1 -0.1 0.7 1.0 1.8 3.1 3.2 2.0 0.7 0.0 0.0 1.1
1.9 1.3 1.4 0.9 4.9 2.0 0.9 1.5 2.0 0.1 1.1 0.9 -0.6 -0.4 -0.1 2.4 1.1 1.9 2.9 4.7 0.7 0.5 -0.3 1.7 1.8
1.1 1.7 1.1 1.1 0.8 0.6 1.3 1.3 0.8 0.9 1.0 1.2 1.4 0.8 0.5 0.8 0.1 0.5 0.0 0.5 0.4
0.5 -0.1 -0.5 -0.1 -0.8 1.0 0.8 -0.3 -0.1 -0.2 -0.4 -0.3 -0.8 0.2 -0.3 -0.1 -0.4
0.0 -0.3 -2.0 0.2 0.7 0.1 0.4 0.9 1.0 -0.8 -2.3 -0.2 -0.7 0.4 0.3 0.5 0.5 0.7
1.4 1.4 0.6 0.8 3.5 1.3 1.2 2.0 3.5 1.6 2.3 1.0 0.4 0.8 0.3 0.9 0.3
1.5 1.1 1.7 3.0 1.5 1.9 1.6 0.0 1.6

Figure 6b. AIRCRAFT 1000 - 301 hPa mean O-B speeds (ms-1). APRIL 2003
Observations with O-B vector difference greater than 60 ms-1 excluded
Values are printed where greater than 30 obs are present

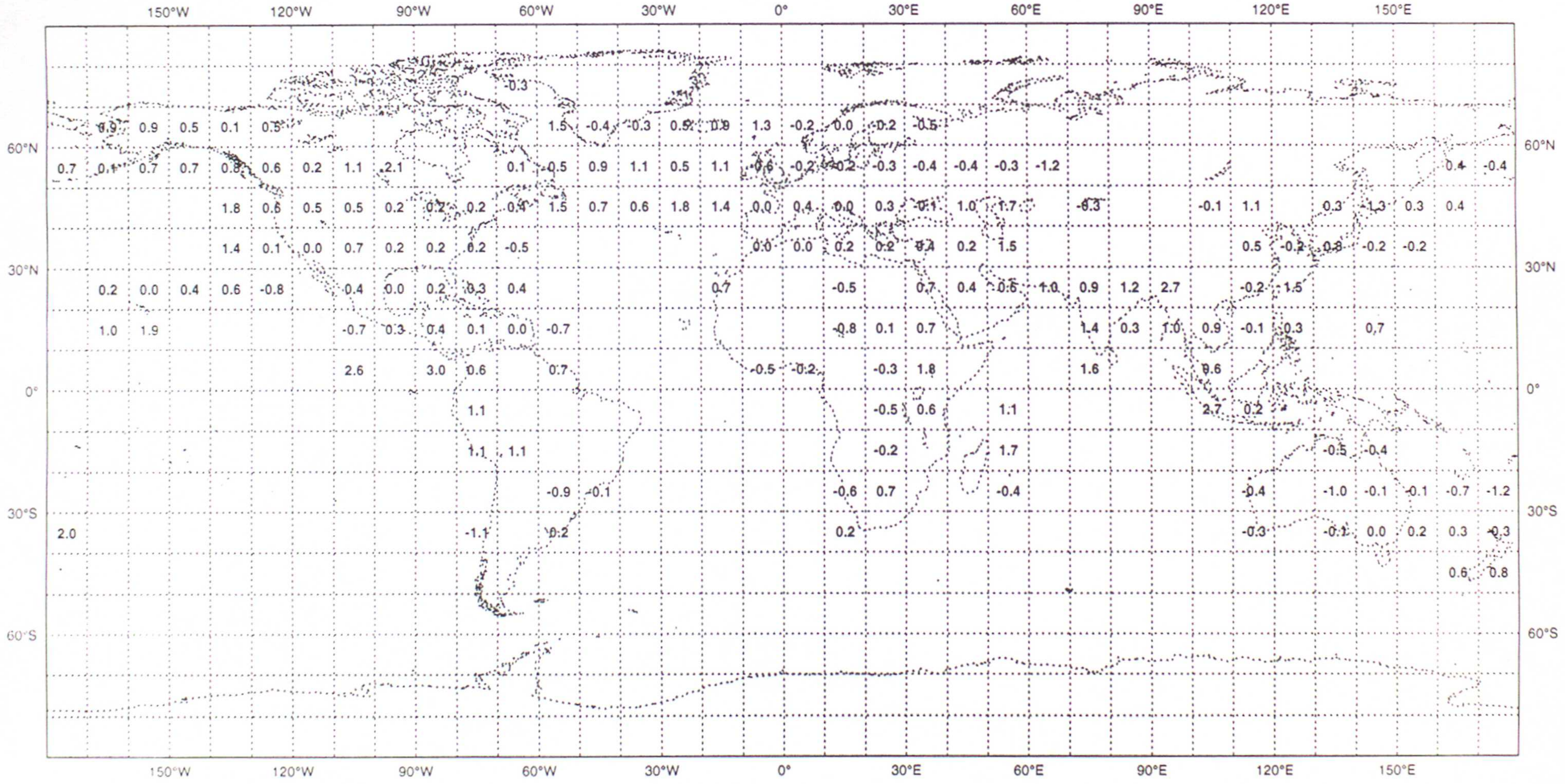

150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S
-0.3
0.9 0.9 0.5 0.1 0.5 1.5 -0.4 -0.3 0.5 0.9 1.3 -0.2 0.0 -0.2 -0.5
0.7 0.1 0.7 0.7 0.8 0.6 0.2 1.1 2.1 0.1 -0.5 0.9 1.1 0.5 1.1 -0.6 -0.2 -0.2 -0.3 -0.4 -0.4 -0.3 -1.2 0.4 -0.4
1.8 0.6 0.5 0.5 0.2 0.2 0.2 0.4 1.5 0.7 0.6 1.8 1.4 0.0 0.4 0.0 0.3 -0.1 1.0 1.7 -0.3 -0.1 1.1 0.3 1.3 0.3 0.4
1.4 0.1 0.0 0.7 0.2 0.2 0.2 -0.5 0.0 0.0 0.2 0.2 0.4 0.2 1.5 0.5 -0.2 0.8 -0.2 -0.2
0.2 0.0 0.4 0.6 -0.8 -0.4 0.0 0.2 0.3 0.4 0.7 -0.5 0.7 0.4 0.6 1.0 0.9 1.2 2.7 -0.2 1.5
1.0 1.9 -0.7 0.3 0.4 0.1 0.0 -0.7 -0.8 0.1 0.7 1.4 0.3 1.0 0.9 -0.1 0.3 0.7
2.6 3.0 0.6 0.7 -0.5 -0.2 -0.3 1.8 1.6 0.6
1.1 -0.5 0.6 1.1 2.7 0.2
1.1 1.1 -0.2 1.7 -0.5 -0.4
-0.9 -0.1 -0.6 0.7 -0.4 -0.4 -1.0 -0.1 -0.1 -0.7 -1.2
2.0 -1.1 0.2 0.2 -0.3 -0.1 0.0 0.2 0.3 -0.3
0.6 0.8

Figure 7a. AIRCRAFT 300 - 150 hPa RMS O-B vector (ms-1). APRIL 2003
Observations with O-B vector difference greater than 60 ms-1 excluded
Values are printed where greater than 30 obs are present

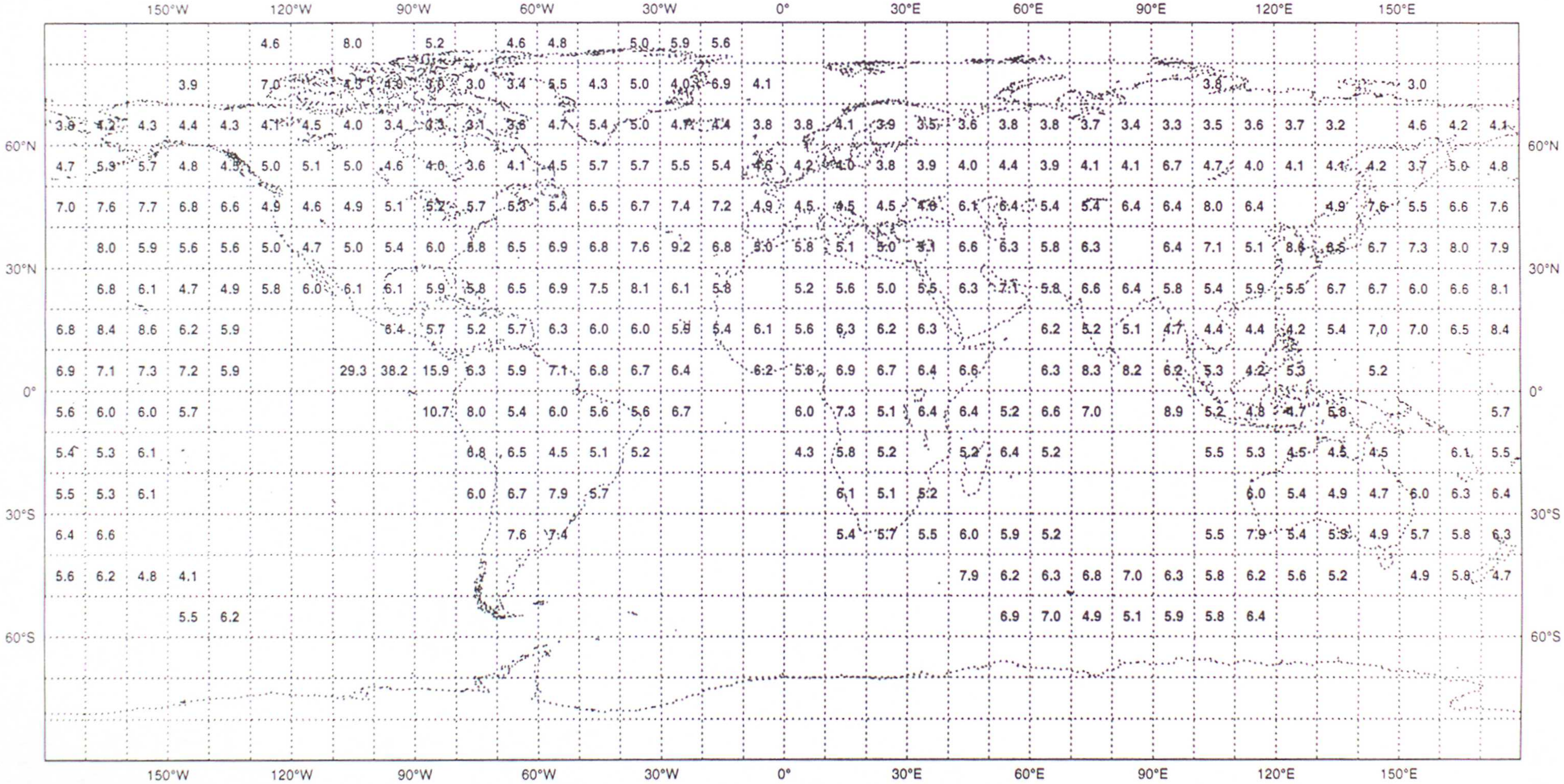

150°W 120°W 90°W 60°W 30°W 0° 30°E 60°E 90°E 120°E 150°E
60°N 30°N 0° 30°S 60°S
4.6 8.0 5.2 4.6 4.8 5.0 5.9 5.6
3.9 7.0 4.3 4.0 3.0 3.0 3.4 5.5 4.3 5.0 4.0 6.9 4.1 3.8 3.0
3.8 4.2 4.3 4.4 4.3 4.1 4.5 4.0 3.4 3.3 3.1 3.8 4.7 5.4 5.0 4.7 4.4 3.8 3.8 4.1 3.9 3.5 3.6 3.8 3.8 3.7 3.4 3.3 3.5 3.6 3.7 3.2 4.6 4.2 4.1
4.7 5.9 5.7 4.8 4.9 5.0 5.1 5.0 4.6 4.0 3.6 4.1 4.5 5.7 5.7 5.5 5.4 4.6 4.2 4.0 3.8 3.9 4.0 4.4 3.9 4.1 4.1 6.7 4.7 4.0 4.1 4.1 4.2 3.7 5.0 4.8
7.0 7.6 7.7 6.8 6.6 4.9 4.6 4.9 5.1 5.2 5.7 5.3 5.4 6.5 6.7 7.4 7.2 4.9 4.5 4.5 4.5 4.0 6.1 6.4 5.4 5.4 6.4 6.4 8.0 6.4 4.9 7.6 5.5 6.6 7.6
8.0 5.9 5.6 5.6 5.0 4.7 5.0 5.4 6.0 6.8 6.5 6.9 6.8 7.6 9.2 6.8 5.0 5.8 5.1 5.0 3.1 6.6 6.3 5.8 6.3 6.4 7.1 5.1 8.6 8.5 6.7 7.3 8.0 7.9
6.8 6.1 4.7 4.9 5.8 6.0 6.1 6.1 5.9 5.8 6.5 6.9 7.5 8.1 6.1 5.8 5.2 5.6 5.0 5.5 6.3 7.1 5.8 6.6 6.4 5.8 5.4 5.9 5.5 6.7 6.7 6.0 6.6 8.1
6.8 8.4 8.6 6.2 5.9 6.4 5.7 5.2 5.7 6.3 6.0 6.0 5.9 5.4 6.1 5.6 6.3 6.2 6.3 6.2 5.2 5.1 4.7 4.4 4.4 4.2 5.4 7.0 7.0 6.5 8.4
6.9 7.1 7.3 7.2 5.9 29.3 38.2 15.9 6.3 5.9 7.1 6.8 6.7 6.4 6.2 5.8 6.9 6.7 6.4 6.6 6.3 8.3 8.2 6.2 5.3 4.2 5.3 5.2
5.6 6.0 6.0 5.7 10.7 8.0 5.4 6.0 5.6 5.6 6.7 6.0 7.3 5.1 6.4 6.4 5.2 6.6 7.0 8.9 5.2 4.8 4.7 5.8 5.7
5.4 5.3 6.1 6.8 6.5 4.5 5.1 5.2 4.3 5.8 5.2 5.2 6.4 5.2 5.5 5.3 4.5 4.5 4.5 6.1 5.5
5.5 5.3 6.1 6.0 6.7 7.9 5.7 6.1 5.1 5.2 6.0 5.4 4.9 4.7 6.0 6.3 6.4
6.4 6.6 7.6 7.4 5.4 5.7 5.5 6.0 5.9 5.2 5.5 7.9 5.4 5.3 4.9 5.7 5.8 6.3
5.6 6.2 4.8 4.1 7.9 6.2 6.3 6.8 7.0 6.3 5.8 6.2 5.6 5.2 4.9 5.8 4.7
5.5 6.2 6.9 7.0 4.9 5.1 5.9 5.8 6.4

Figure 7b. AIRCRAFT 1000 - 301 hPa RMS O-B vector (ms-1). APRIL 2003
Observations with O-B vector difference greater than 60 ms-1 excluded
Values are printed where greater than 30 obs are present

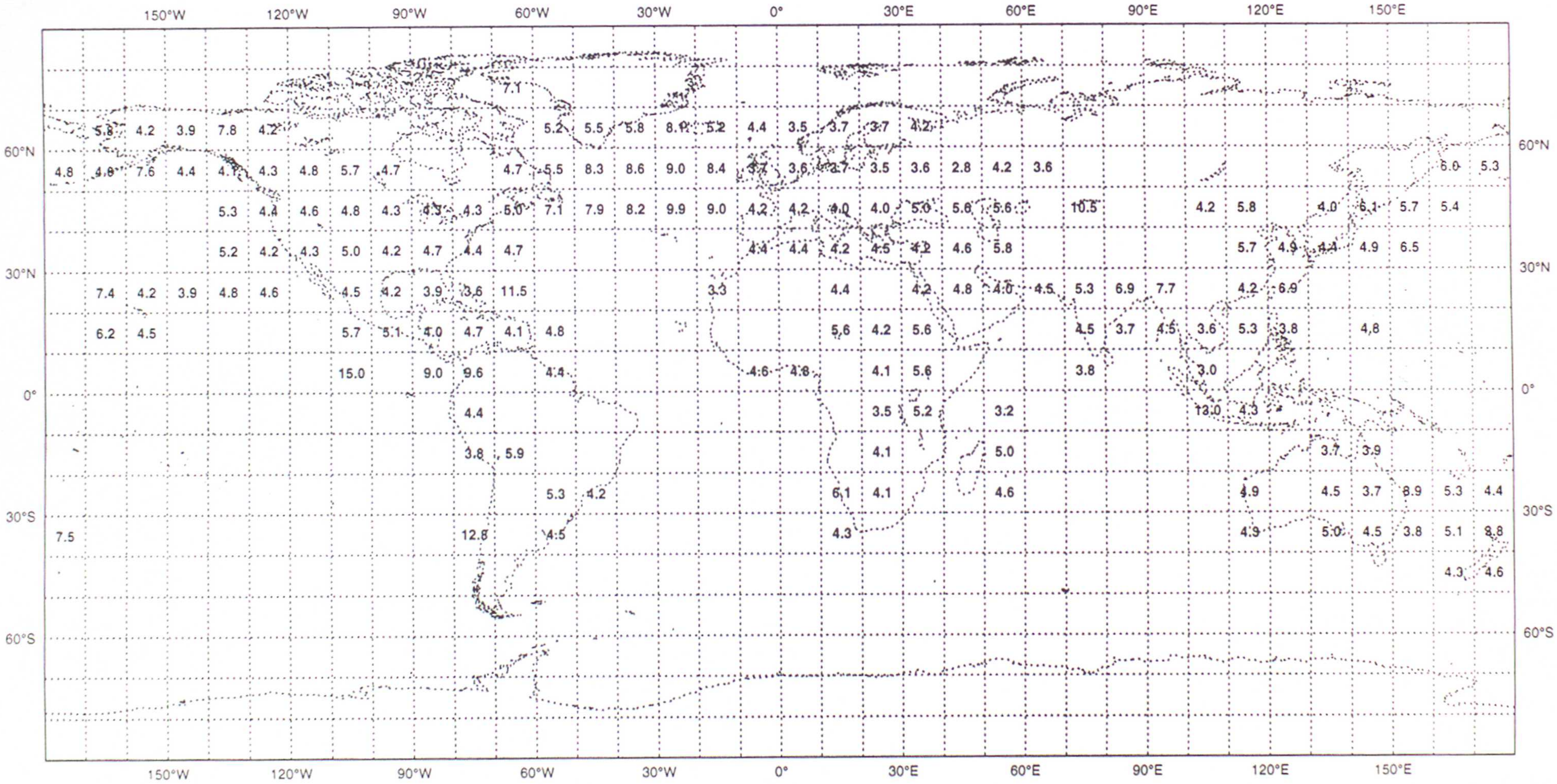

150°W 120°W 90°W 60°W 30°W 0° 30°E 60°E 90°E 120°E 150°E
60°N 30°N 0° 30°S 60°S
7.1
5.8 4.2 3.9 7.8 4.2 5.2 5.5 5.8 8.1 5.2 4.4 3.5 3.7 3.7 4.2
4.8 4.8 7.6 4.4 4.1 4.3 4.8 5.7 4.7 4.7 5.5 8.3 8.6 9.0 8.4 3.7 3.6 3.7 3.5 3.6 2.8 4.2 3.6 6.0 5.3
5.3 4.4 4.6 4.8 4.3 4.3 4.3 5.0 7.1 7.9 8.2 9.9 9.0 4.2 4.2 4.0 4.0 5.0 5.6 5.6 10.5 4.2 5.8 4.0 6.1 5.7 5.4
5.2 4.2 4.3 5.0 4.2 4.7 4.4 4.7 4.4 4.4 4.2 4.5 4.2 4.6 5.8 5.7 4.9 4.4 4.9 6.5
7.4 4.2 3.9 4.8 4.6 4.5 4.2 3.9 3.6 11.5 3.3 4.4 4.2 4.8 4.0 4.5 5.3 6.9 7.7 4.2 6.9
6.2 4.5 5.7 5.1 4.0 4.7 4.1 4.8 5.6 4.2 5.6 4.5 3.7 4.5 3.6 5.3 3.8 4.8
15.0 9.0 9.6 4.4 4.6 4.8 4.1 5.6 3.8 3.0
4.4 3.5 5.2 3.2 13.0 4.3
3.8 5.9 4.1 5.0 3.7 3.9
5.3 4.2 6.1 4.1 4.6 4.9 4.5 3.7 8.9 5.3 4.4
7.5 12.8 4.5 4.3 4.9 5.0 4.5 3.8 5.1 8.8
4.3 4.6

TABLE 5

MONTHLY MONITORING OF RADIOSONDE OBSERVATIONS
MONITORING CENTRE: BRACKNELL
MONTH: April 2003

Monitoring procedures

Period :One calendar month.

Data monitored :Reports from each unique identifier for radiosonde TEMPs.

Area monitored :90°N - 90°S, 180°W - 180°E.

Standard of comparison :Background field from UKMO global model.

Observation times :00 UTC and 12 UTC.

Level(s) monitored :Standard levels between 1000.0 - 30.0 hPa

Element monitored :GEOPOTENTIAL HEIGHT IN metres

Parameters monitored

:NUM OBS :Number of observations available at level shown during period.

:NUM GROSS :Number of gross errors at level shown during period.

:% REJ :Percentage of observations rejected by quality control at level shown during period excluding those with gross errors.

:SD :SD of difference of observations from background values at level shown excluding those with gross errors.

:BIAS :Mean difference of observations from background values at level shown excluding those with gross errors.

:RMS :Root Mean Square difference of observations from background values at level shown excluding those with gross errors.

:NUM LEVELS :Number of levels satisfying selection criteria.

GROSS ERROR LIMITS :Defined in Appendix I.1

SELECTION CRITERIA : ≥3 levels with ≥10 observations and ≥ 100 m weighted RMS.

ONLY THE WORST LEVEL IS SHOWN WITH UNWEIGHTED RMS

WMO IDENT	OBS TIME	ELM	LEV	LAT/LONG	NUM OBS	NUM GROSS	SD	BIAS	RMS	NUM LEVELS
20674	12	Z	50	73/ 80	21	1	88.5	238.9	254.7	6
31168	00	Z	1000	56/ 138	23	4	23.8	-45.6	51.4	5
34247	12	Z	50	50/ 41	24	0	94.6	210.8	231.0	8
42339	00	Z	100	26/ 73	14	0	72.0	106.6	128.6	6
42339	12	Z	150	26/ 73	12	0	78.8	133.4	155.0	7
42361	12	Z	200	26/ 78	20	1	96.6	-27.8	100.5	7
42369	00	Z	1000	27/ 81	20	3	19.9	-70.6	73.3	8
42369	12	Z	1000	27/ 81	6	12	17.6	-79.8	81.8	8
42379	00	Z	200	27/ 83	13	0	39.3	-81.0	90.0	6
42379	12	Z	200	27/ 83	14	0	36.5	-94.2	101.0	7
42397	12	Z	150	27/ 88	15	0	104.3	15.4	105.4	5
42647	12	Z	250	23/ 73	18	0	85.1	62.5	105.6	6
42667	12	Z	150	23/ 77	18	0	113.3	-22.0	115.4	5
42809	00	Z	200	23/ 88	28	0	79.6	-49.5	93.7	5
42809	12	Z	200	23/ 88	26	0	66.1	-60.6	89.7	6
42867	00	Z	50	21/ 79	11	1	101.4	126.4	162.0	6
42867	12	Z	70	21/ 79	11	0	135.5	183.3	227.9	10
42874	12	Z	150	21/ 82	15	0	80.0	95.4	124.5	4
43003	12	Z	1000	19/ 73	22	7	8.5	-83.5	83.9	10
43014	00	Z	250	20/ 75	23	1	86.3	-47.3	98.4	6
43014	12	Z	150	20/ 75	14	0	111.5	41.1	118.9	6
43041	12	Z	200	19/ 82	14	0	86.0	-35.5	93.0	4
43128	00	Z	100	17/ 78	21	0	95.2	-99.3	137.6	4
43128	12	Z	100	17/ 78	24	0	104.3	65.8	123.3	4
43150	12	Z	1000	18/ 83	3	25	5.7	-95.0	95.2	4
43185	00	Z	150	16/ 81	15	0	87.4	-32.4	93.3	4
43192	00	Z	150	15/ 74	17	0	64.6	-95.4	115.2	6
43295	12	Z	100	13/ 78	25	0	117.7	27.2	120.8	4
43311	00	Z	200	11/ 73	26	0	45.3	-101.7	111.3	6
43311	12	Z	200	11/ 73	25	0	76.5	-60.6	97.6	7
43346	00	Z	30	11/ 80	14	0	110.5	218.4	244.7	6
43353	00	Z	1000	10/ 76	16	10	6.3	-88.3	88.5	4
43369	00	Z	400	8/ 73	26	0	41.6	72.2	83.3	7
43369	12	Z	250	8/ 73	29	0	63.4	105.5	123.1	7
43371	00	Z	100	8/ 77	18	2	87.4	-119.0	147.6	6
61902	12	Z	1000	-8/ -14	18	0	31.6	40.1	51.0	7
78866	12	Z	700	18/ -63	18	1	27.5	44.9	52.7	8
78970	12	Z	30	11/ -61	11	14	73.6	343.8	351.6	11
96035	00	Z	30	4/ 99	10	0	136.1	163.3	212.6	4
96935	00	Z	1000	-7/ 113	12	2	9.5	-85.9	86.4	6
97180	00	Z	200	-5/ 120	13	0	54.0	-70.2	88.5	5

Figure 8. TEMP 500 hPa geopotential mean daily count. APRIL 2003
All hours
Global average number of observations in 24 hours = 1175

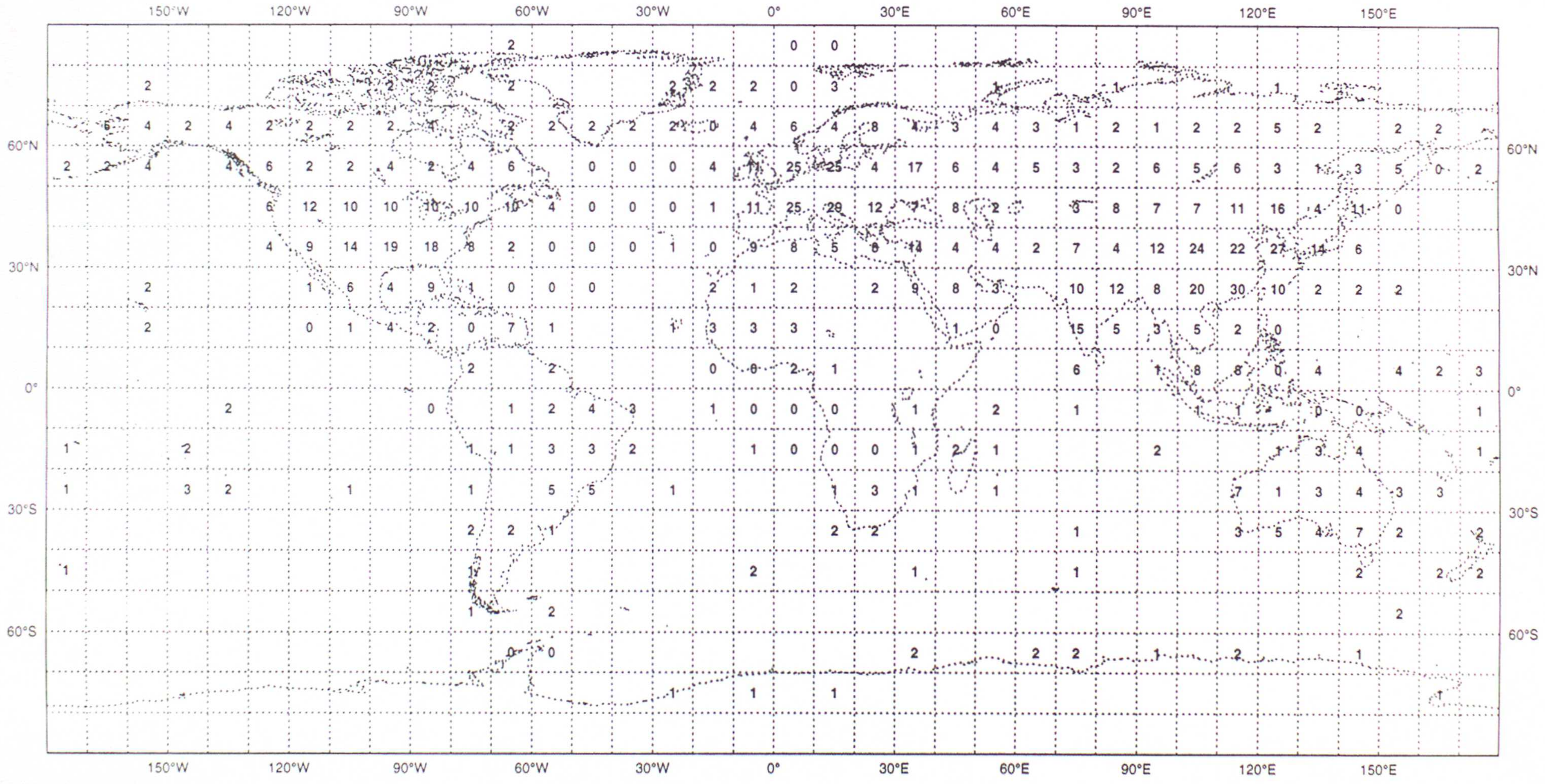

150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S

TABLE 6

MONTHLY MONITORING OF RADIOSONDE OBSERVATIONS
MONITORING CENTRE: BRACKNELL
MONTH: April 2003

Monitoring procedures

Period :One calendar month.

Data monitored :Reports from each unique identifier for radiosonde TEMPs.

Area monitored :90°N - 90°S, 180°W - 180°E.

Standard of comparison :Background field from UKMO global model.

Observation times :00 UTC and 12 UTC.

Level(s) monitored :Standard levels between 1000.0 - 100.0 hPa

Element monitored :VECTOR WIND in m s^{-1}

Parameters monitored

:NUM OBS :Number of observations available at level shown during period.

:NUM GROSS :Number of gross errors at level shown during period.

:% REJ :Percentage of observations rejected by quality control at level shown during period excluding those with gross errors.

:UBIAS,VBIAS :Mean difference of observations of U and V components from background values at level shown excluding those with gross errors.

:RMS :Root Mean Square difference of observations from background values at level shown excluding those with gross errors.

:NUM LEVELS :Number of levels satisfying selection criteria.

GROSS ERROR LIMITS :Defined in Appendix I.2

SELECTION CRITERIA : ≥ 10 observations and ≥ 15 m s^{-1} RMS vector wind.

ONLY THE STANDARD LEVEL BETWEEN 1000 - 100 hPa WITH HIGHEST RMS IS SHOWN

WMO IDENT	OBS TIME	ELM	LEV	LAT/LONG	NUM OBS	NUM GROSS	% REJ	UBIAS	VBIAS	RMS	LEVELS
PSPIU	00	V	100	-5/ -81	26	0	100	1.0	-2.9	25.2	3
PSPIU	12	V	150	-5/ -81	27	0	100	-8.7	-4.4	26.5	3
08579	12	V	250	39/ -9	11	0	9	-3.4	-4.3	17.7	1
10771	12	V	300	49/ 12	30	0	3	-2.1	2.4	17.4	1
40754	00	V	250	36/ 51	22	0	4	0.5	-4.4	18.4	1
40948	12	V	200	35/ 69	26	0	0	2.0	8.0	15.7	1
42361	12	V	150	26/ 78	10	1	100	13.0	-1.0	20.9	1
42410	12	V	400	26/ 92	16	0	100	11.0	6.8	16.8	3
50527	00	V	150	49/ 120	30	0	16	7.6	-3.1	17.4	1
60360	12	V	150	37/ 8	16	0	100	5.8	2.3	20.4	2
62378	00	V	200	30/ 31	25	0	100	-14.8	-2.5	17.6	2
62378	12	V	200	30/ 31	27	0	100	-13.5	-1.7	17.2	2
62414	12	V	150	24/ 33	24	0	4	-7.8	-1.2	26.0	1
62423	12	V	150	27/ 28	23	0	100	-6.5	2.3	24.8	1
68442	12	V	200	-29/ 26	13	0	15	-13.4	0.3	19.0	2
68461	12	V	200	-28/ 28	11	0	9	-14.8	-2.5	18.4	3
68512	12	V	200	-30/ 18	18	0	100	-11.4	0.4	15.6	1
71701	12	V	250	46/ -66	21	0	57	-0.6	3.2	20.6	1

Figure 9. TEMP/PILOT 300 hPa wind mean daily count. APRIL 2003
All hours
Global average number of observations in 24 hours = 1381

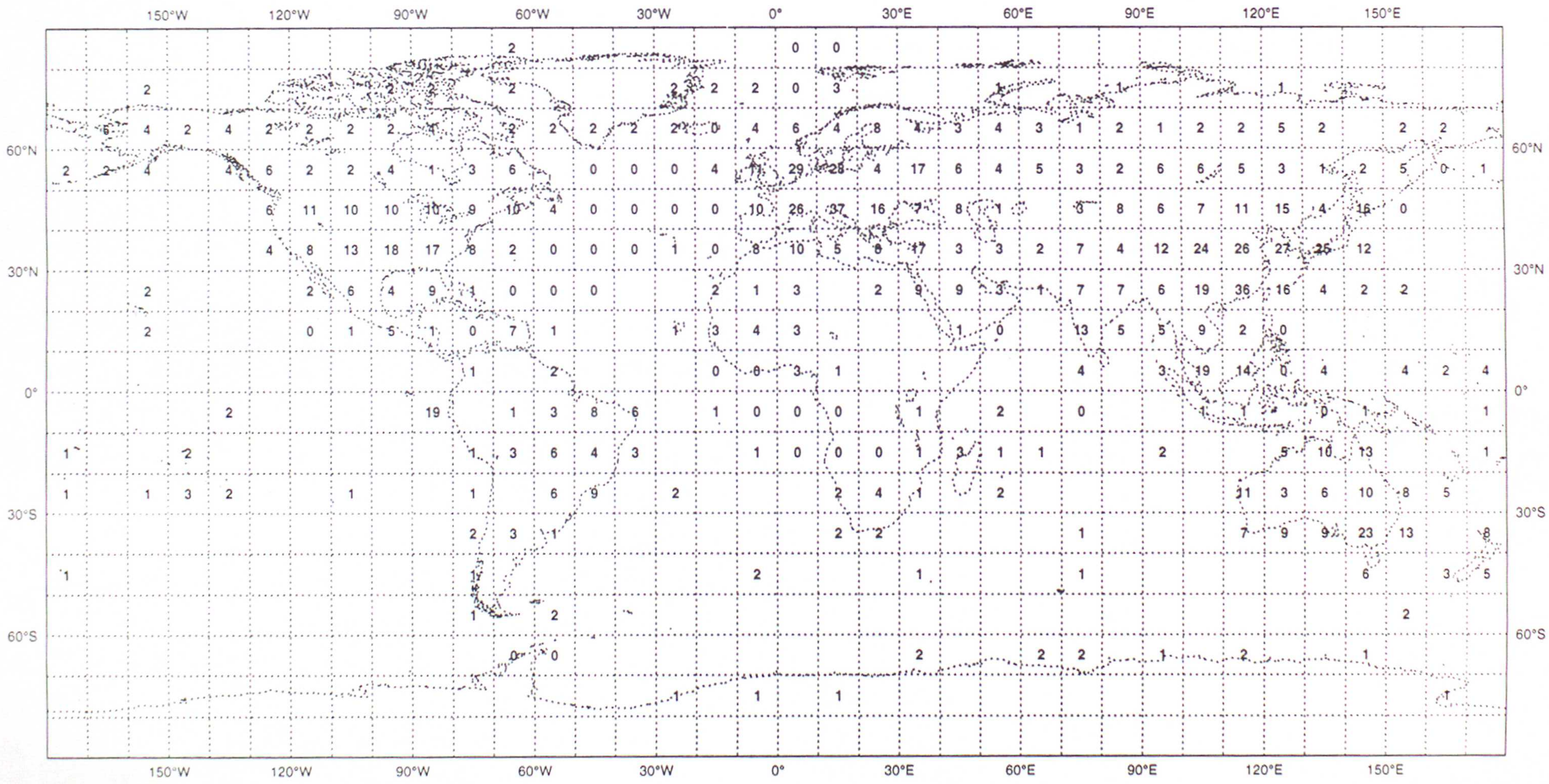

150°W 120°W 90°W 60°W 30°W 0° 30°E 60°E 90°E 120°E 150°E
60°N 30°N 0° 30°S 60°S
2 0 0
2 2 2 2 2 2 2 0 3 1 1 1
6 4 2 4 2 2 2 2 4 2 2 2 2 2 0 4 6 4 8 4 3 4 3 1 2 1 2 2 5 2 2 2
2 2 4 4 6 2 2 4 1 3 6 0 0 0 4 11 29 28 4 17 6 4 5 3 2 6 6 5 3 1 2 5 0 1
6 11 10 10 10 9 10 4 0 0 0 0 10 26 37 16 7 8 1 3 8 6 7 11 15 4 16 0
4 8 13 18 17 8 2 0 0 0 1 0 8 10 5 6 17 3 3 2 7 4 12 24 26 27 25 12
2 2 6 4 9 1 0 0 0 2 1 3 2 9 9 3 1 7 7 6 19 36 16 4 2 2
2 0 1 5 1 0 7 1 1 3 4 3 1 0 13 5 5 9 2 0
1 2 0 0 3 1 4 3 19 14 0 4 4 2 4
2 19 1 3 8 6 1 0 0 0 1 2 0 1 1 0 1 1
1 2 1 3 6 4 3 1 0 0 0 1 3 1 1 2 5 10 13 1
1 1 3 2 1 1 6 9 2 2 4 1 2 11 3 6 10 8 5
2 3 1 2 2 1 7 9 9 23 13 8
1 1 2 1 1 6 3 5
1 2 2
0 0 2 2 2 1 2 1
1 1 1 1

TABLE 7

MONTHLY MONITORING OF RADIOSONDE OBSERVATIONS
MONITORING CENTRE: BRACKNELL
MONTH: April 2003

Monitoring procedures

Period		:One calendar month.
Data monitored		:Reports from each unique identifier for radiosonde TEMPs.
Area monitored		:90°N - 90°S, 180°W - 180°E.
Standard of comparison		:Background field from UKMO global model.
Observation times		:00 UTC and 12 UTC.
Level(s) monitored		:Standard levels between 500.0 - 150.0 hPa
Element monitored		:WIND DIRECTION in degrees
Parameters monitored		
	:NUM OBS	:Average number of observations at all levels.
	:BIAS	:Mean difference of observations from background values from all levels.
	:MAX SPREAD	:(For observation - background values) Maximum absolute difference of SD at any level from SD at all levels
	:SD	:SD of difference of observations from background values at all levels.

SELECTION CRITERIA

:NUM OBS ≥ 5, and
ABSOLUTE BIAS $\geq 10°$, with
SD $< 30°$, and
MAX SPREAD $< 10°$

WMO IDENT	OBS TIME	ELM	LAT/LONG	NUM OBS	BIAS	MAX SPREAD	SD
40948	00	DD	35/ 69	24	-19.6	4.0	17.9
40948	12	DD	35/ 69	26	-18.4	3.9	17.1
42182	00	DD	29/ 77	27	10.1	5.1	15.4
42182	12	DD	29/ 77	28	13.2	3.4	14.0
43295	12	DD	13/ 78	16	-11.0	7.2	17.4
62337	00	DD	31/ 34	26	-13.6	0.7	6.6
62337	12	DD	31/ 34	25	-13.2	2.5	6.9

MONITORING OF SATELLITE WINDS

MONITORING CENTRE: BRACKNELL

MONTH: April 2003

Monitoring procedures

Period :One calendar month.

Data monitored :Reports from GOES-8, GOES-10, METEOSAT-5, METEOSAT-7, GMS-5, INSAT.

Standard of comparison :Background field from UKMO global model.

Selection Criteria :number of observations > 10.

Data Extracted :Layer 701 - 1000 hPa
401 - 700 hPa
101 - 400 hPa

:Mean wind

:Mean observation minus background vector wind differences

:Mean observation minus background speed differences

:RMS of observation minus background vector differences

Figure 10. SATOB 701 - 1000 hPa mean daily count. APRIL 2003
Global average number of observations in 24 hours = 77323

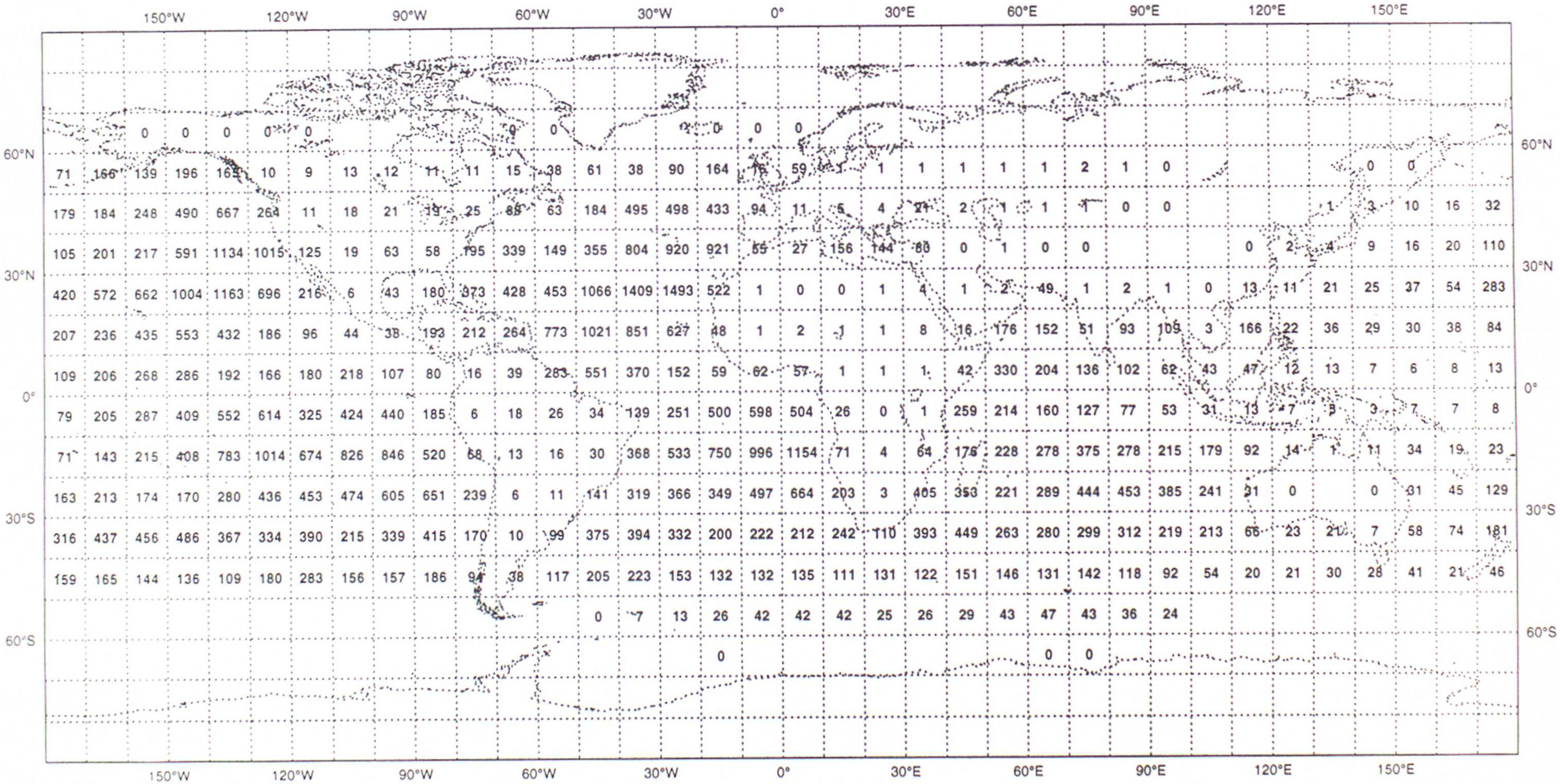

150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S
0 0 0 0 0 0 0 0 0 0
71 166 139 196 165 10 9 13 12 11 11 15 38 61 38 90 164 76 59 1 1 1 1 1 1 2 1 0 0 0
179 184 248 490 667 264 11 18 21 19 25 88 63 184 495 498 433 94 11 5 4 21 2 1 1 1 0 0 1 3 10 16 32
105 201 217 591 1134 1015 125 19 63 58 195 339 149 355 804 920 921 55 27 156 144 80 0 1 0 0 0 2 4 9 16 20 110
420 572 662 1004 1163 696 216 6 43 180 373 428 453 1066 1409 1493 522 1 0 0 1 4 1 2 49 1 2 1 0 13 11 21 25 37 54 283
207 236 435 553 432 186 96 44 38 193 212 264 773 1021 851 627 48 1 2 1 1 8 16 176 152 51 93 109 3 166 22 36 29 30 38 84
109 206 268 286 192 166 180 218 107 80 16 39 283 551 370 152 59 62 57 1 1 1 42 330 204 136 102 62 43 47 12 13 7 6 8 13
79 205 287 409 552 614 325 424 440 185 6 18 26 34 139 251 500 598 504 26 0 1 259 214 160 127 77 53 31 13 7 3 3 7 7 8
71 143 215 408 783 1014 674 826 846 520 68 13 16 30 368 533 750 996 1154 71 4 64 176 228 278 375 278 215 179 92 14 1 11 34 19 23
163 213 174 170 280 436 453 474 605 651 239 6 11 141 319 366 349 497 664 203 3 405 353 221 289 444 453 385 241 31 0 0 31 45 129
316 437 456 486 367 334 390 215 339 415 170 10 99 375 394 332 200 222 212 242 110 393 449 263 280 299 312 219 213 66 23 21 7 58 74 181
159 165 144 136 109 180 283 156 157 186 94 38 117 205 223 153 132 132 135 111 131 122 151 146 131 142 118 92 54 20 21 30 28 41 21 46
0 7 13 26 42 42 42 25 26 29 43 47 43 36 24
0 0 0

Figure 11. SATOB 701 - 1000 hPa vector mean wind. APRIL 2003
All observations
Arrows are plotted where greater than 10 obs are present

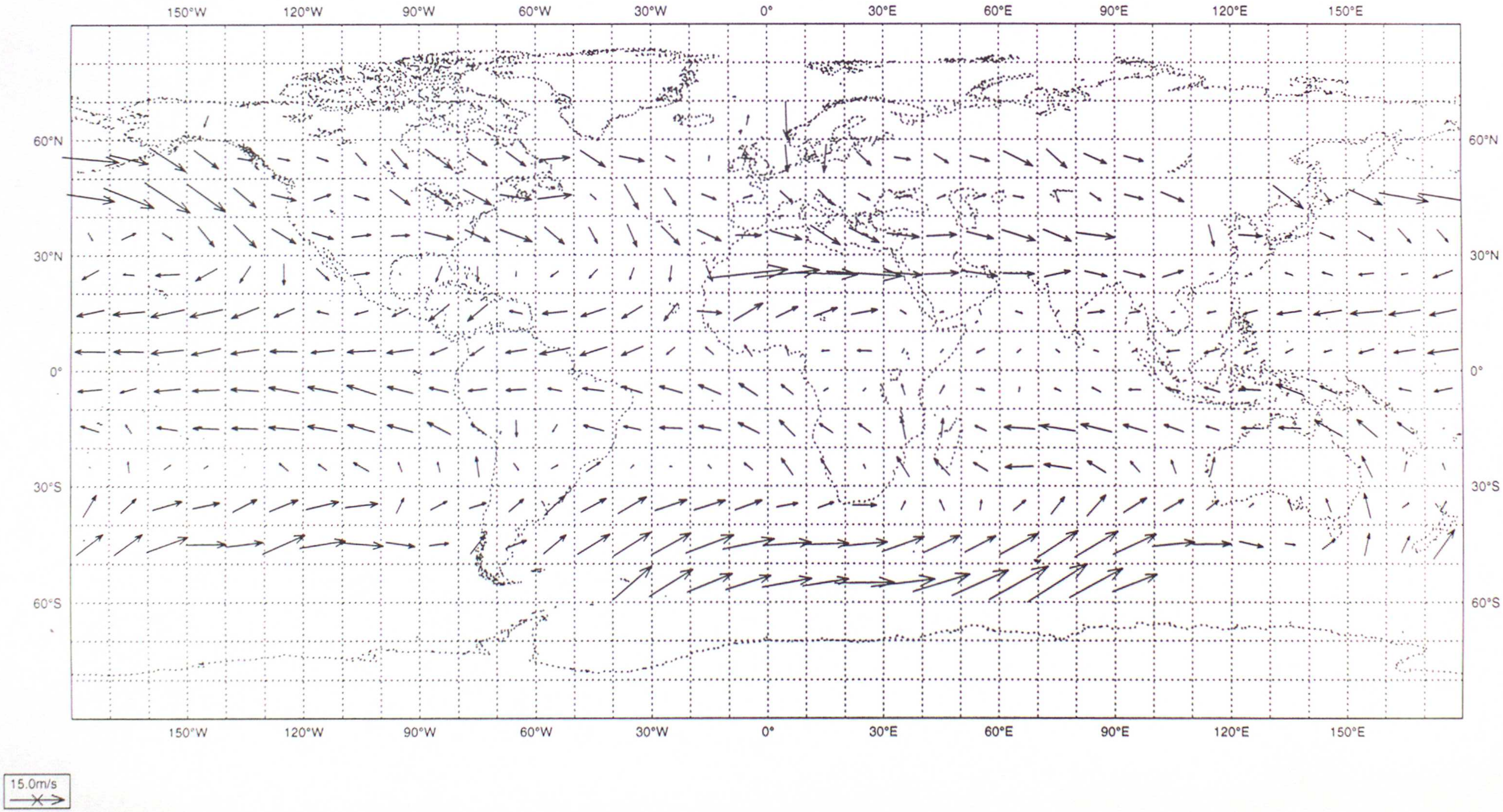

150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S
15.0m/s

Figure 12. SATOB 701 - 1000 hPa mean vector wind differences. APRIL 2003
All observations
Arrows are plotted where greater than 10 obs are present

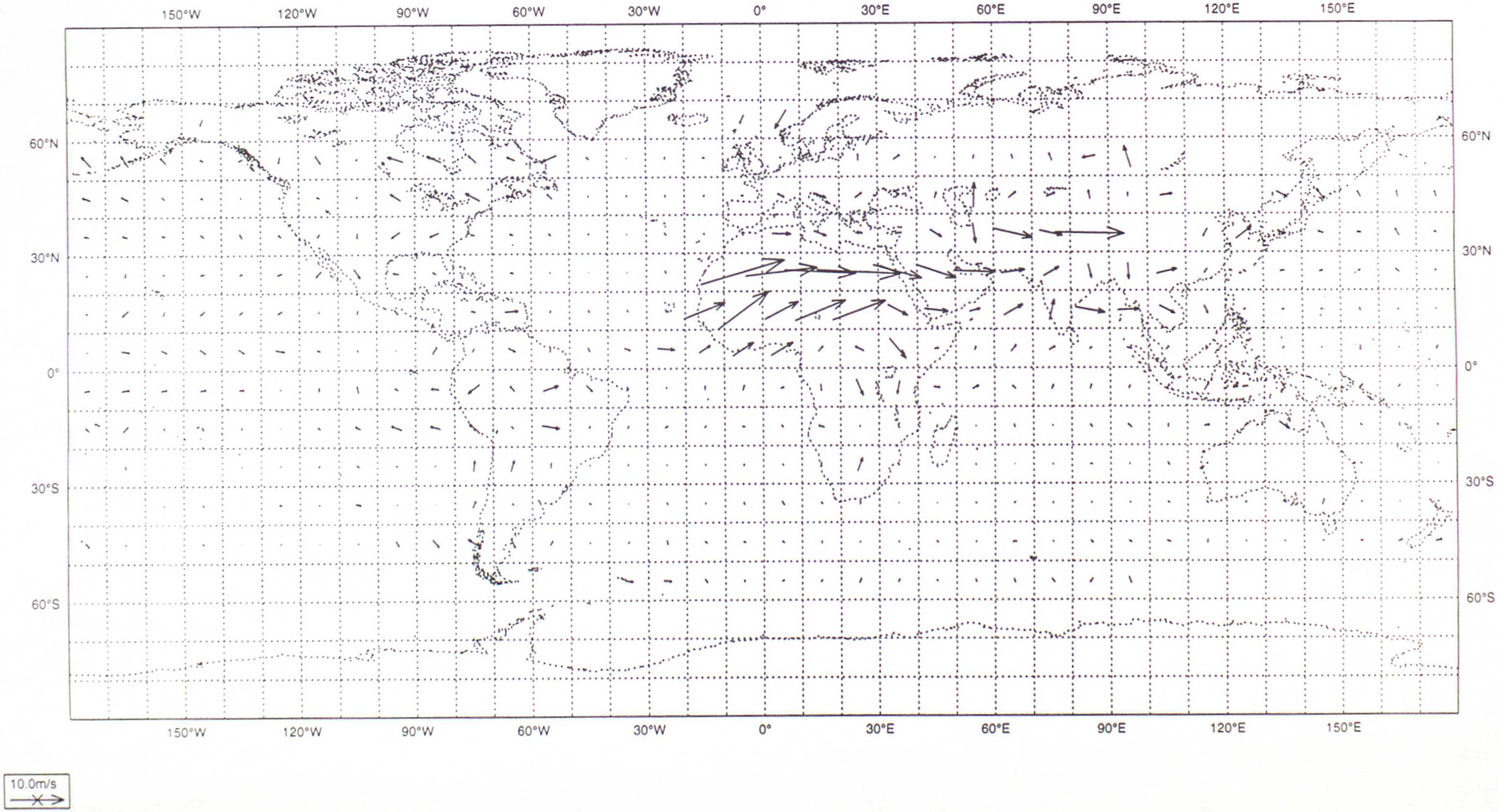

150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S
10.0m/s

Figure 13. SATOB 701 - 1000 hPa mean O-B speed differences (ms-1). APRIL 2003
All observations
Values are plotted where greater than 10 obs are present

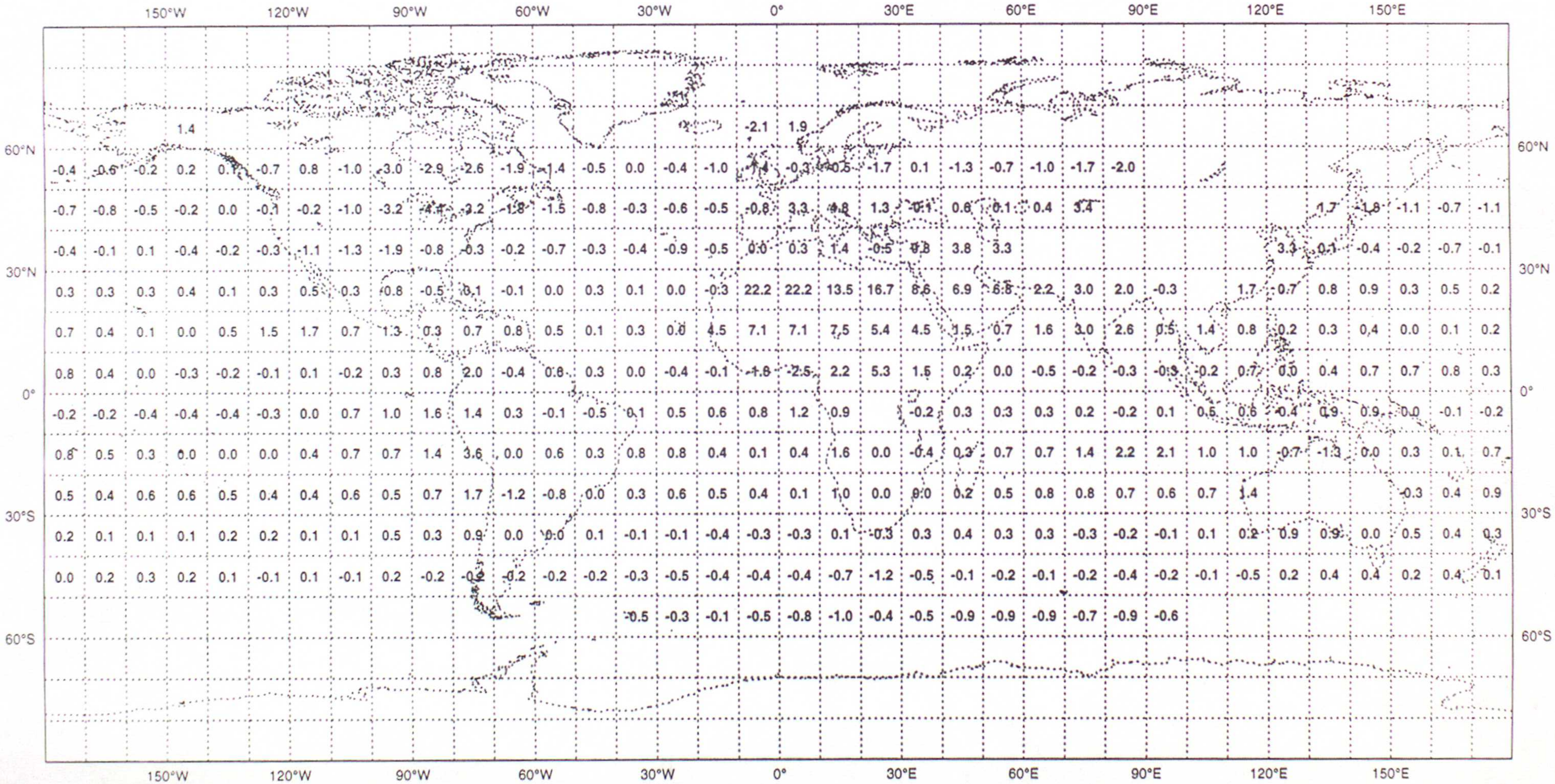

150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S
1.4 -2.1 1.9
-0.4 -0.6 -0.2 0.2 0.1 -0.7 0.8 -1.0 -3.0 -2.9 -2.6 -1.9 -1.4 -0.5 0.0 -0.4 -1.0 -1.4 -0.3 -0.5 -1.7 0.1 -1.3 -0.7 -1.0 -1.7 -2.0
-0.7 -0.8 -0.5 -0.2 0.0 -0.1 -0.2 -1.0 -3.2 -4.4 -3.2 -1.8 -1.5 -0.8 -0.3 -0.6 -0.5 -0.8 3.3 4.8 1.3 -0.1 0.6 0.1 0.4 3.4 1.7 -1.8 -1.1 -0.7 -1.1
-0.4 -0.1 0.1 -0.4 -0.2 -0.3 -1.1 -1.3 -1.9 -0.8 -0.3 -0.2 -0.7 -0.3 -0.4 -0.9 -0.5 0.0 0.3 1.4 -0.5 0.8 3.8 3.3 3.3 0.1 -0.4 -0.2 -0.7 -0.1
0.3 0.3 0.3 0.4 0.1 0.3 0.5 0.3 0.8 -0.5 0.1 -0.1 0.0 0.3 0.1 0.0 -0.3 22.2 22.2 13.5 16.7 8.6 6.9 6.8 2.2 3.0 2.0 -0.3 1.7 0.7 0.8 0.9 0.3 0.5 0.2
0.7 0.4 0.1 0.0 0.5 1.5 1.7 0.7 1.3 0.3 0.7 0.8 0.5 0.1 0.3 0.0 4.5 7.1 7.1 7.5 5.4 4.5 1.5 0.7 1.6 3.0 2.6 0.5 1.4 0.8 0.2 0.3 0.4 0.0 0.1 0.2
0.8 0.4 0.0 -0.3 -0.2 -0.1 0.1 -0.2 0.3 0.8 2.0 -0.4 0.6 0.3 0.0 -0.4 -0.1 -1.8 -2.5 2.2 5.3 1.5 0.2 0.0 -0.5 -0.2 -0.3 -0.3 -0.2 0.7 0.0 0.4 0.7 0.7 0.8 0.3
-0.2 -0.2 -0.4 -0.4 -0.4 -0.3 0.0 0.7 1.0 1.6 1.4 0.3 -0.1 -0.5 0.1 0.5 0.6 0.8 1.2 0.9 -0.2 0.3 0.3 0.3 0.2 -0.2 0.1 0.5 0.6 -0.4 0.9 0.9 0.0 -0.1 -0.2
0.8 0.5 0.3 0.0 0.0 0.0 0.4 0.7 0.7 1.4 3.6 0.0 0.6 0.3 0.8 0.8 0.4 0.1 0.4 1.6 0.0 -0.4 0.3 0.7 0.7 1.4 2.2 2.1 1.0 1.0 -0.7 -1.3 0.0 0.3 0.1 0.7
0.5 0.4 0.6 0.6 0.5 0.4 0.4 0.6 0.5 0.7 1.7 -1.2 -0.8 0.0 0.3 0.6 0.5 0.4 0.1 1.0 0.0 0.0 0.2 0.5 0.8 0.8 0.7 0.6 0.7 1.4 -0.3 0.4 0.9
0.2 0.1 0.1 0.1 0.2 0.2 0.1 0.1 0.5 0.3 0.9 0.0 0.0 0.1 -0.1 -0.1 -0.4 -0.3 -0.3 0.1 -0.3 0.3 0.4 0.3 0.3 -0.3 -0.2 -0.1 0.1 0.2 0.9 0.9 0.0 0.5 0.4 0.3
0.0 0.2 0.3 0.2 0.1 -0.1 0.1 -0.1 0.2 -0.2 -0.2 -0.2 -0.2 -0.2 -0.3 -0.5 -0.4 -0.4 -0.4 -0.7 -1.2 -0.5 -0.1 -0.2 -0.1 -0.2 -0.4 -0.2 -0.1 -0.5 0.2 0.4 0.4 0.2 0.4 0.1
-0.5 -0.3 -0.1 -0.5 -0.8 -1.0 -0.4 -0.5 -0.9 -0.9 -0.9 -0.7 -0.9 -0.6

Figure 14. SATOB 701 - 1000 hPa mean RMS O-B vector differences (ms-1). APRIL 2003
All observations
Values are plotted where greater than 10 obs are present

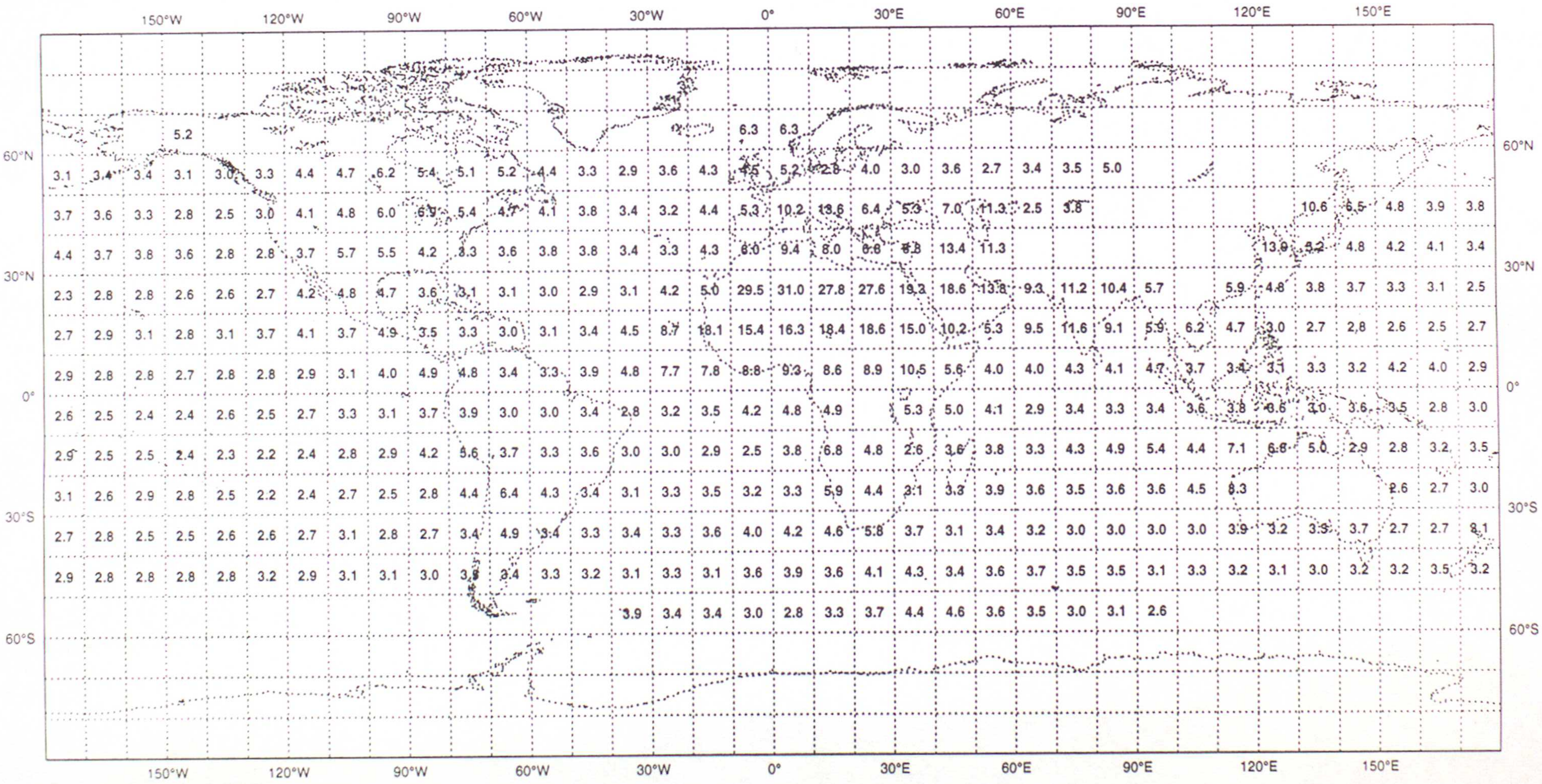

150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S
5.2 6.3 6.3
3.1 3.4 3.4 3.1 3.0 3.3 4.4 4.7 6.2 5.4 5.1 5.2 4.4 3.3 2.9 3.6 4.3 4.5 5.2 2.8 4.0 3.0 3.6 2.7 3.4 3.5 5.0
3.7 3.6 3.3 2.8 2.5 3.0 4.1 4.8 6.0 6.9 5.4 4.7 4.1 3.8 3.4 3.2 4.4 5.3 10.2 13.6 6.4 5.3 7.0 11.3 2.5 3.8 10.6 6.5 4.8 3.9 3.8
4.4 3.7 3.8 3.6 2.8 2.8 3.7 5.7 5.5 4.2 3.3 3.6 3.8 3.8 3.4 3.3 4.3 8.0 9.4 8.0 6.6 8.8 13.4 11.3 13.9 5.2 4.8 4.2 4.1 3.4
2.3 2.8 2.8 2.6 2.6 2.7 4.2 4.8 4.7 3.6 3.1 3.1 3.0 2.9 3.1 4.2 5.0 29.5 31.0 27.8 27.6 19.3 18.6 13.8 9.3 11.2 10.4 5.7 5.9 4.8 3.8 3.7 3.3 3.1 2.5
2.7 2.9 3.1 2.8 3.1 3.7 4.1 3.7 4.9 3.5 3.3 3.0 3.1 3.4 4.5 8.7 18.1 15.4 16.3 18.4 18.6 15.0 10.2 5.3 9.5 11.6 9.1 5.9 6.2 4.7 3.0 2.7 2.8 2.6 2.5 2.7
2.9 2.8 2.8 2.7 2.8 2.8 2.9 3.1 4.0 4.9 4.8 3.4 3.3 3.9 4.8 7.7 7.8 8.8 9.3 8.6 8.9 10.5 5.6 4.0 4.0 4.3 4.1 4.7 3.7 3.4 3.1 3.3 3.2 4.2 4.0 2.9
2.6 2.5 2.4 2.4 2.6 2.5 2.7 3.3 3.1 3.7 3.9 3.0 3.0 3.4 2.8 3.2 3.5 4.2 4.8 4.9 5.3 5.0 4.1 2.9 3.4 3.3 3.4 3.6 3.8 6.6 3.0 3.6 3.5 2.8 3.0
2.9 2.5 2.5 2.4 2.3 2.2 2.4 2.8 2.9 4.2 5.6 3.7 3.3 3.6 3.0 3.0 2.9 2.5 3.8 6.8 4.8 2.6 3.6 3.8 3.3 4.3 4.9 5.4 4.4 7.1 6.8 5.0 2.9 2.8 3.2 3.5
3.1 2.6 2.9 2.8 2.5 2.2 2.4 2.7 2.5 2.8 4.4 6.4 4.3 3.4 3.1 3.3 3.5 3.2 3.3 5.9 4.4 3.1 3.3 3.9 3.6 3.5 3.6 3.6 4.5 8.3 2.6 2.7 3.0
2.7 2.8 2.5 2.5 2.6 2.6 2.7 3.1 2.8 2.7 3.4 4.9 3.4 3.3 3.4 3.3 3.6 4.0 4.2 4.6 5.8 3.7 3.1 3.4 3.2 3.0 3.0 3.0 3.0 3.9 3.2 3.3 3.7 2.7 2.7 8.1
2.9 2.8 2.8 2.8 2.8 3.2 2.9 3.1 3.1 3.0 3.8 3.4 3.3 3.2 3.1 3.3 3.1 3.6 3.9 3.6 4.1 4.3 3.4 3.6 3.7 3.5 3.5 3.1 3.3 3.2 3.1 3.0 3.2 3.2 3.5 3.2
3.9 3.4 3.4 3.0 2.8 3.3 3.7 4.4 4.6 3.6 3.5 3.0 3.1 2.6

Figure 15. SATOB 401 - 700 hPa mean daily count. APRIL 2003
Global average number of observations in 24 hours = 16233

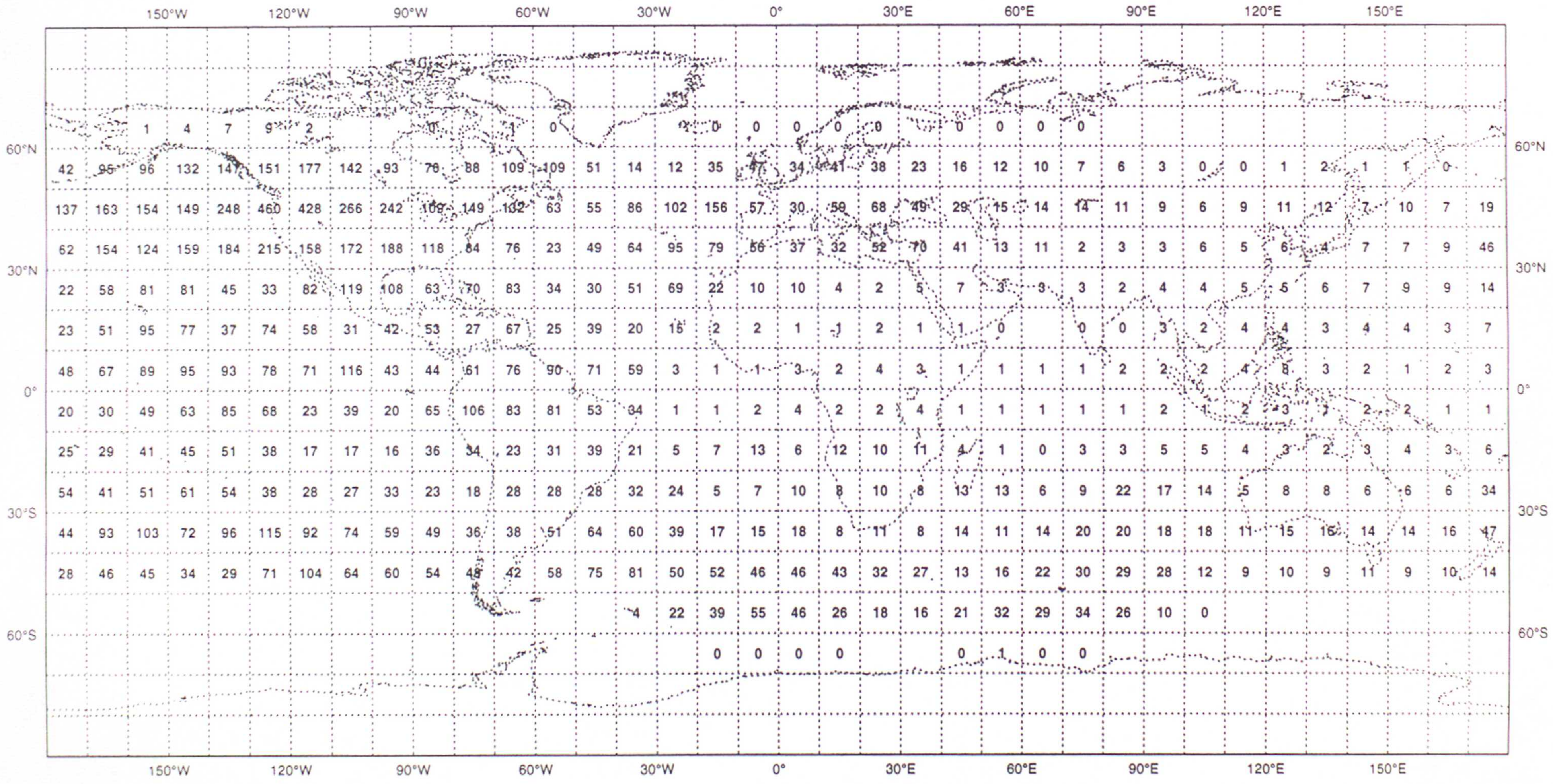

150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S
1 4 7 9 2 0 1 0 0 0 0 0 0 0 0 0 0
42 95 96 132 147 151 177 142 93 76 88 109 109 51 14 12 35 47 34 41 38 23 16 12 10 7 6 3 0 0 1 2 1 1 0
137 163 154 149 248 460 428 266 242 109 149 102 63 55 86 102 156 57 30 59 68 49 29 15 14 14 11 9 6 9 11 12 7 10 7 19
62 154 124 159 184 215 158 172 188 118 84 76 23 49 64 95 79 56 37 32 52 70 41 13 11 2 3 3 6 5 6 4 7 7 9 46
22 58 81 81 45 33 82 119 108 63 70 83 34 30 51 69 22 10 10 4 2 5 7 3 3 3 2 4 4 5 5 6 7 9 9 14
23 51 95 77 37 74 58 31 42 53 27 67 25 39 20 15 2 2 1 1 2 1 1 0 0 0 3 2 4 4 3 4 4 3 7
48 67 89 95 93 78 71 116 43 44 61 76 90 71 59 3 1 1 3 2 4 3 1 1 1 1 2 2 2 4 8 3 2 1 2 3
20 30 49 63 85 68 23 39 20 65 106 83 81 53 34 1 1 2 4 2 2 4 1 1 1 1 1 2 1 2 3 7 2 2 1 1
25 29 41 45 51 38 17 17 16 36 34 23 31 39 21 5 7 13 6 12 10 11 4 1 0 3 3 5 5 4 3 2 3 4 3 6
54 41 51 61 54 38 28 27 33 23 18 28 28 28 32 24 5 7 10 8 10 8 13 13 6 9 22 17 14 5 8 8 6 6 6 34
44 93 103 72 96 115 92 74 59 49 36 38 51 64 60 39 17 15 18 8 11 8 14 11 14 20 20 18 18 11 15 16 14 14 16 47
28 46 45 34 29 71 104 64 60 54 48 42 58 75 81 50 52 46 46 43 32 27 13 16 22 30 29 28 12 9 10 9 11 9 10 14
4 22 39 55 46 26 18 16 21 32 29 34 26 10 0
0 0 0 0 0 1 0 0

Figure 16. SATOB 401 - 700 hPa vector mean wind. APRIL 2003
All observations
Arrows are plotted where greater than 10 obs are present

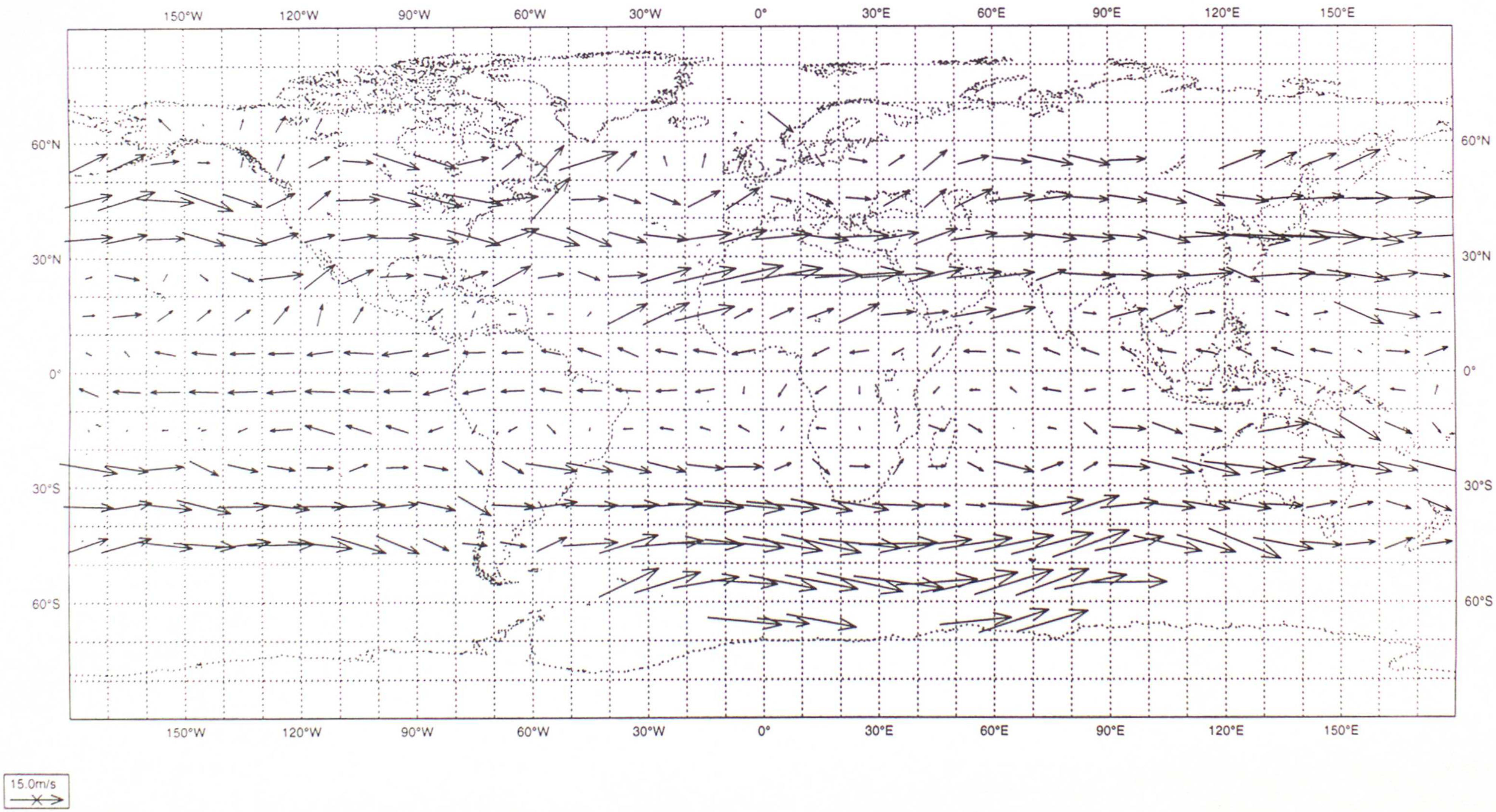

150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S
15.0m/s

Figure 17. SATOB 401 - 700 hPa mean vector wind differences. APRIL 2003
All observations
Arrows are plotted where greater than 10 obs are present

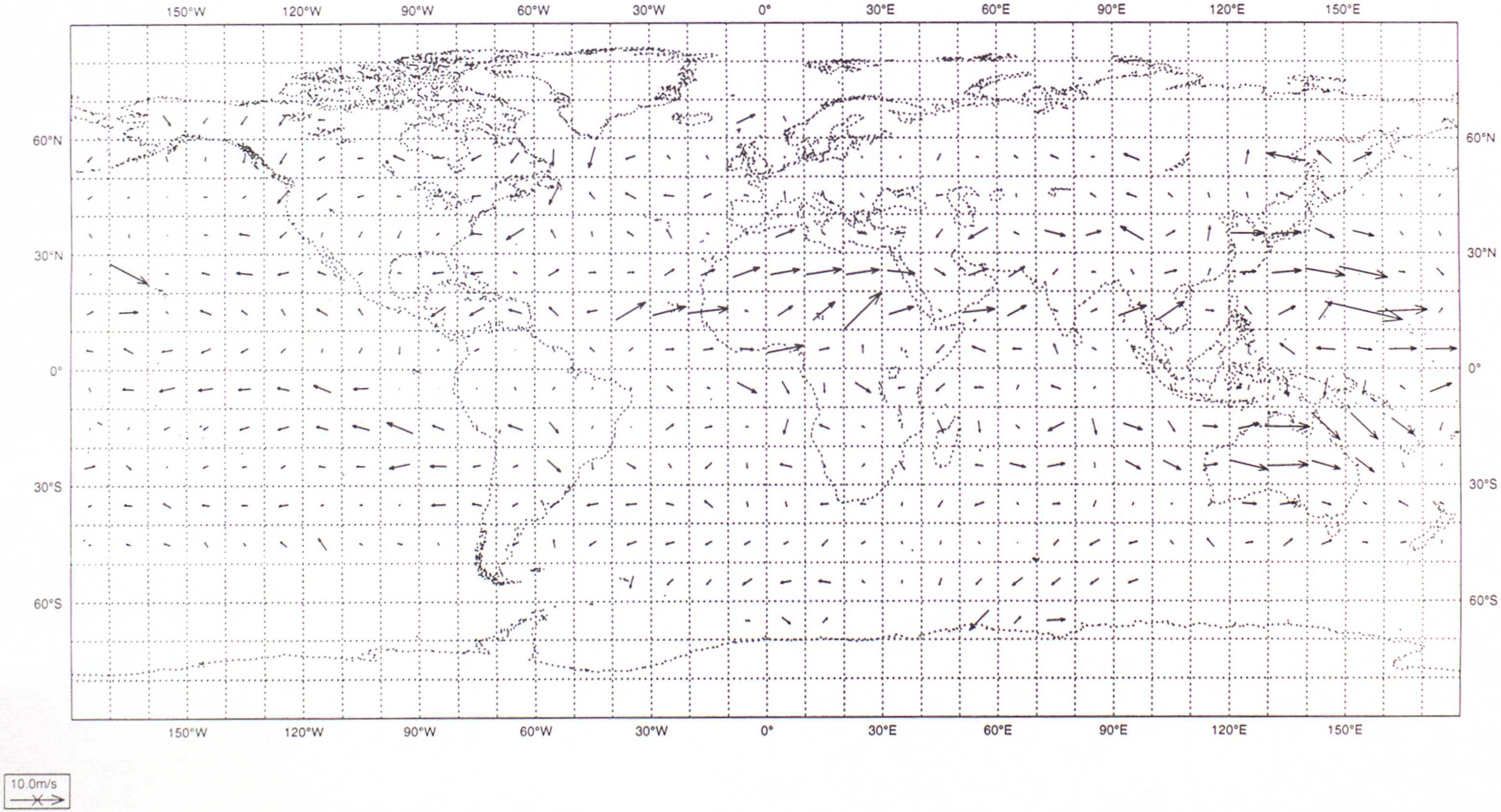

150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S
10.0m/s

Figure 18. SATOB 401 - 700 hPa mean O-B speed differences (ms-1). APRIL 2003
All observations
Values are plotted where greater than 10 obs are present

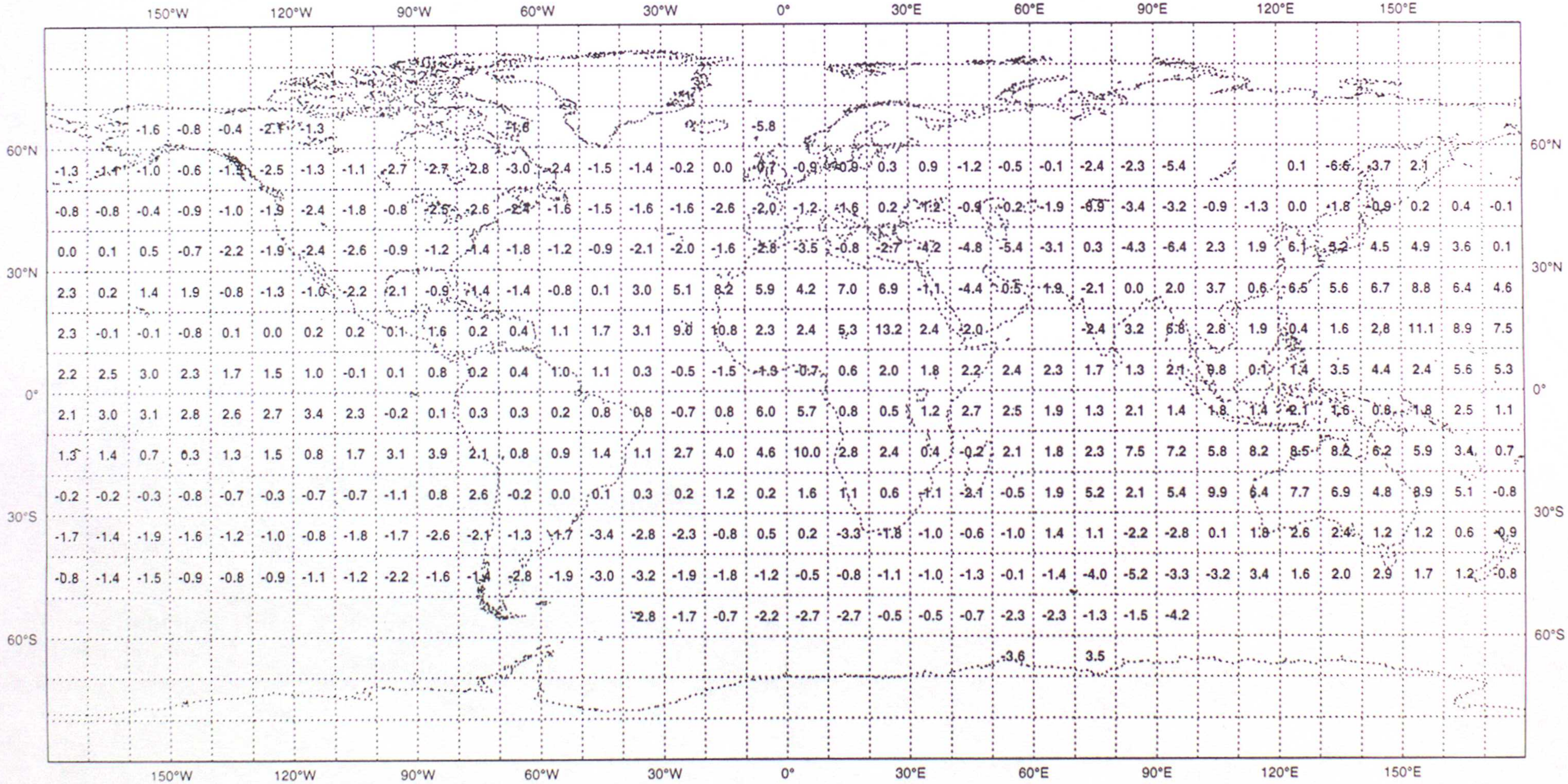

150°W 120°W 90°W 60°W 30°W 0° 30°E 60°E 90°E 120°E 150°E
60°N
30°N
0°
30°S
60°S
-1.6 -0.8 -0.4 -2.1 -1.3 -1.6 -5.8
-1.3 -1.1 -1.0 -0.6 -1.3 -2.5 -1.3 -1.1 -2.7 -2.7 -2.8 -3.0 -2.4 -1.5 -1.4 -0.2 0.0 -0.7 -0.9 -0.9 0.3 0.9 -1.2 -0.5 -0.1 -2.4 -2.3 -5.4 0.1 -6.6 -3.7 2.1
-0.8 -0.8 -0.4 -0.9 -1.0 -1.9 -2.4 -1.8 -0.8 -2.5 -2.6 -2.4 -1.6 -1.5 -1.6 -1.6 -2.6 -2.0 -1.2 -1.6 0.2 -1.2 -0.9 -0.2 -1.9 -6.9 -3.4 -3.2 -0.9 -1.3 0.0 -1.8 -0.9 0.2 0.4 -0.1
0.0 0.1 0.5 -0.7 -2.2 -1.9 -2.4 -2.6 -0.9 -1.2 -1.4 -1.8 -1.2 -0.9 -2.1 -2.0 -1.6 -2.8 -3.5 -0.8 -2.7 -4.2 -4.8 -5.4 -3.1 0.3 -4.3 -6.4 2.3 1.9 6.1 5.2 4.5 4.9 3.6 0.1
2.3 0.2 1.4 1.9 -0.8 -1.3 -1.0 -2.2 2.1 -0.9 1.4 -1.4 -0.8 0.1 3.0 5.1 8.2 5.9 4.2 7.0 6.9 -1.1 -4.4 0.5 1.9 -2.1 0.0 2.0 3.7 0.6 6.5 5.6 6.7 8.8 6.4 4.6
2.3 -0.1 -0.1 -0.8 0.1 0.0 0.2 0.2 0.1 1.6 0.2 0.4 1.1 1.7 3.1 9.0 10.8 2.3 2.4 5.3 13.2 2.4 -2.0 -2.4 3.2 6.8 2.8 1.9 0.4 1.6 2.8 11.1 8.9 7.5
2.2 2.5 3.0 2.3 1.7 1.5 1.0 -0.1 0.1 0.8 0.2 0.4 1.0 1.1 0.3 -0.5 -1.5 -1.9 -0.7 0.6 2.0 1.8 2.2 2.4 2.3 1.7 1.3 2.1 0.8 0.1 1.4 3.5 4.4 2.4 5.6 5.3
2.1 3.0 3.1 2.8 2.6 2.7 3.4 2.3 -0.2 0.1 0.3 0.3 0.2 0.8 0.8 -0.7 0.8 6.0 5.7 0.8 0.5 1.2 2.7 2.5 1.9 1.3 2.1 1.4 1.8 1.4 2.1 1.6 0.8 1.8 2.5 1.1
1.3 1.4 0.7 0.3 1.3 1.5 0.8 1.7 3.1 3.9 2.1 0.8 0.9 1.4 1.1 2.7 4.0 4.6 10.0 2.8 2.4 0.4 -0.2 2.1 1.8 2.3 7.5 7.2 5.8 8.2 8.5 8.2 6.2 5.9 3.4 0.7
-0.2 -0.2 -0.3 -0.8 -0.7 -0.3 -0.7 -0.7 -1.1 0.8 2.6 -0.2 0.0 0.1 0.3 0.2 1.2 0.2 1.6 1.1 0.6 -1.1 -2.1 -0.5 1.9 5.2 2.1 5.4 9.9 6.4 7.7 6.9 4.8 8.9 5.1 -0.8
-1.7 -1.4 -1.9 -1.6 -1.2 -1.0 -0.8 -1.8 -1.7 -2.6 -2.1 -1.3 -1.7 -3.4 -2.8 -2.3 -0.8 0.5 0.2 -3.3 -1.8 -1.0 -0.6 -1.0 1.4 1.1 -2.2 -2.8 0.1 1.8 2.6 2.4 1.2 1.2 0.6 -0.9
-0.8 -1.4 -1.5 -0.9 -0.8 -0.9 -1.1 -1.2 -2.2 -1.6 -1.4 -2.8 -1.9 -3.0 -3.2 -1.9 -1.8 -1.2 -0.5 -0.8 -1.1 -1.0 -1.3 -0.1 -1.4 -4.0 -5.2 -3.3 -3.2 3.4 1.6 2.0 2.9 1.7 1.2 -0.8
-2.8 -1.7 -0.7 -2.2 -2.7 -2.7 -0.5 -0.5 -0.7 -2.3 -2.3 -1.3 -1.5 -4.2
-3.6 3.5

Figure 19. SATOB 401 - 700 hPa mean RMS O-B vector differences (ms-1). APRIL 2003
All observations
Values are plotted where greater than 10 obs are present

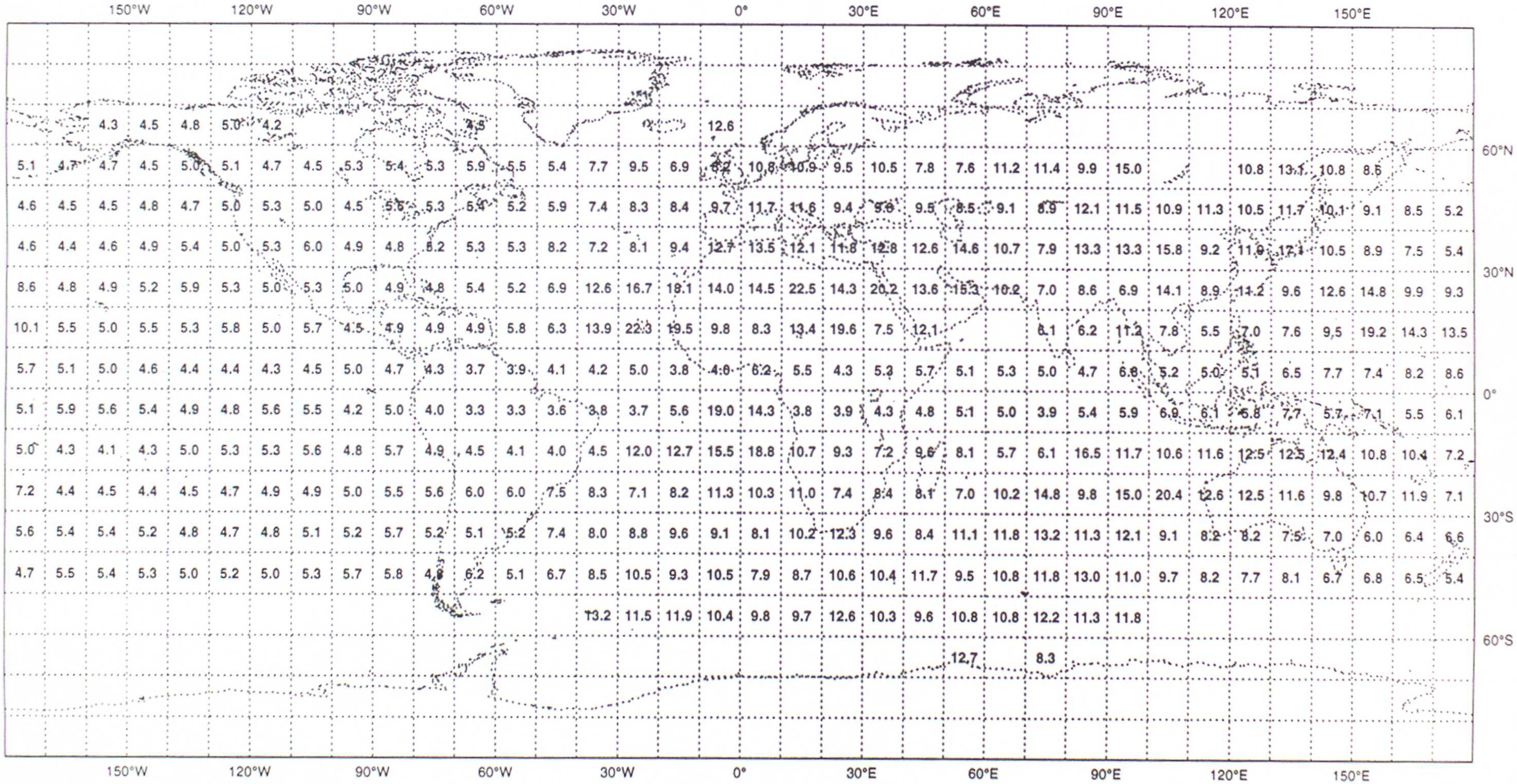
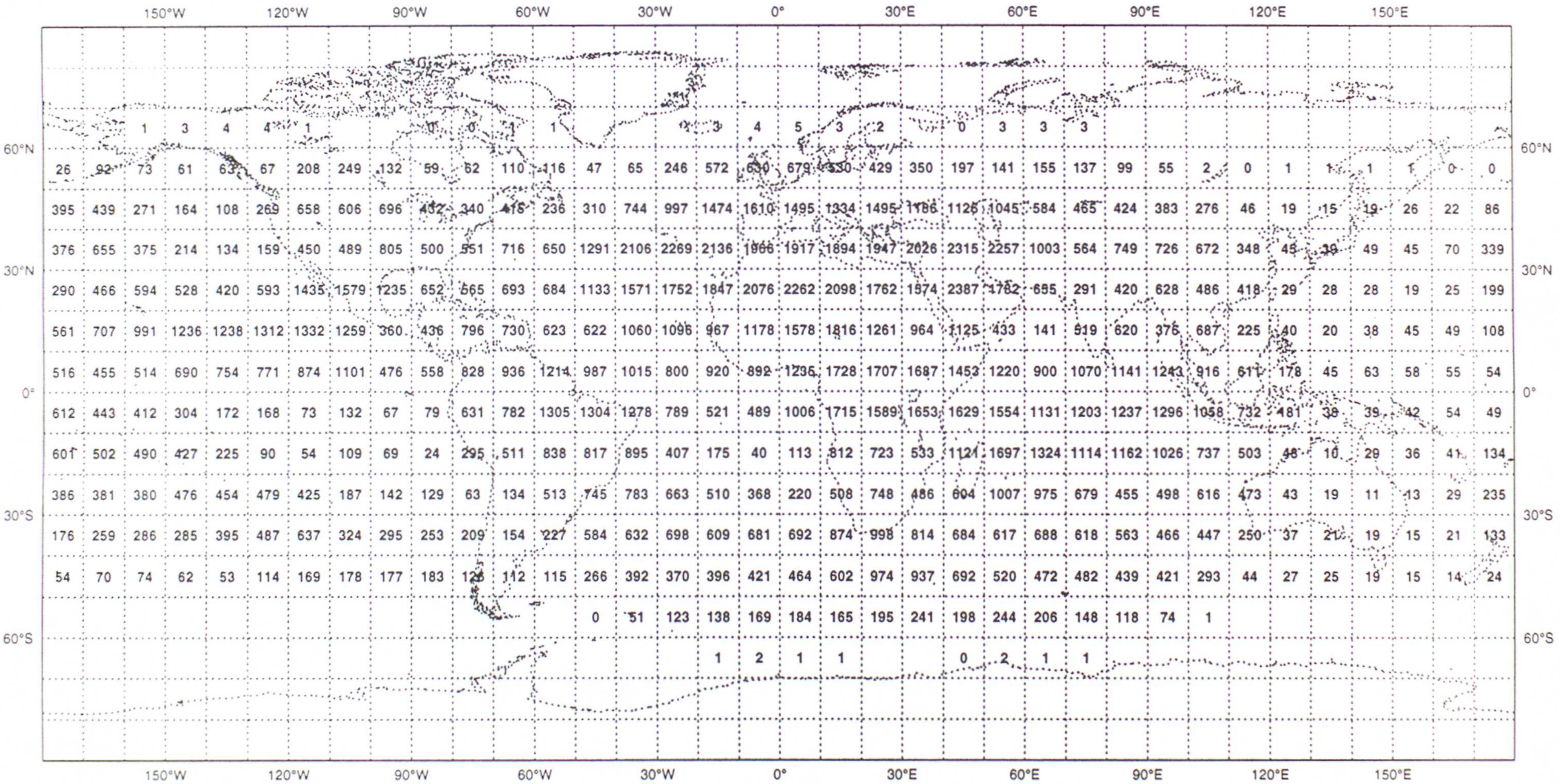

150°W 120°W 90°W 60°W 30°W 0° 30°E 60°E 90°E 120°E 150°E
60°N 30°N 0° 30°S 60°S
4.3 4.5 4.8 5.0 4.2 4.5 12.6
5.1 4.7 4.7 4.5 5.0 5.1 4.7 4.5 5.3 5.4 5.3 5.9 5.5 5.4 7.7 9.5 6.9 6.2 10.8 10.9 9.5 10.5 7.8 7.6 11.2 11.4 9.9 15.0 10.8 13.1 10.8 8.6
4.6 4.5 4.5 4.8 4.7 5.0 5.3 5.0 4.5 5.6 5.3 5.4 5.2 5.9 7.4 8.3 8.4 9.7 11.7 11.6 9.4 9.6 9.5 8.5 9.1 8.9 12.1 11.5 10.9 11.3 10.5 11.7 10.1 9.1 8.5 5.2
4.6 4.4 4.6 4.9 5.4 5.0 5.3 6.0 4.9 4.8 8.2 5.3 5.3 8.2 7.2 8.1 9.4 12.7 13.5 12.1 11.8 12.8 12.6 14.6 10.7 7.9 13.3 13.3 15.8 9.2 11.9 17.1 10.5 8.9 7.5 5.4
8.6 4.8 4.9 5.2 5.9 5.3 5.0 5.3 5.0 4.9 4.8 5.4 5.2 6.9 12.6 16.7 18.1 14.0 14.5 22.5 14.3 20.2 13.6 15.3 10.2 7.0 8.6 6.9 14.1 8.9 11.2 9.6 12.6 14.8 9.9 9.3
10.1 5.5 5.0 5.5 5.3 5.8 5.0 5.7 4.5 4.9 4.9 4.9 5.8 6.3 13.9 22.3 19.5 9.8 8.3 13.4 19.6 7.5 12.1 8.1 6.2 11.2 7.8 5.5 7.0 7.6 9.5 19.2 14.3 13.5
5.7 5.1 5.0 4.6 4.4 4.4 4.3 4.5 5.0 4.7 4.3 3.7 3.9 4.1 4.2 5.0 3.8 4.0 6.2 5.5 4.3 5.3 5.7 5.1 5.3 5.0 4.7 6.8 5.2 5.0 5.1 6.5 7.7 7.4 8.2 8.6
5.1 5.9 5.6 5.4 4.9 4.8 5.6 5.5 4.2 5.0 4.0 3.3 3.3 3.6 3.8 3.7 5.6 19.0 14.3 3.8 3.9 4.3 4.8 5.1 5.0 3.9 5.4 5.9 6.9 6.1 6.8 7.7 5.7 7.1 5.5 6.1
5.0 4.3 4.1 4.3 5.0 5.3 5.3 5.6 4.8 5.7 4.9 4.5 4.1 4.0 4.5 12.0 12.7 15.5 18.8 10.7 9.3 7.2 9.6 8.1 5.7 6.1 16.5 11.7 10.6 11.6 12.5 12.5 12.4 10.8 10.4 7.2
7.2 4.4 4.5 4.4 4.5 4.7 4.9 4.9 5.0 5.5 5.6 6.0 6.0 7.5 8.3 7.1 8.2 11.3 10.3 11.0 7.4 8.4 8.1 7.0 10.2 14.8 9.8 15.0 20.4 12.6 12.5 11.6 9.8 10.7 11.9 7.1
5.6 5.4 5.4 5.2 4.8 4.7 4.8 5.1 5.2 5.7 5.2 5.1 5.2 7.4 8.0 8.8 9.6 9.1 8.1 10.2 12.3 9.6 8.4 11.1 11.8 13.2 11.3 12.1 9.1 8.2 8.2 7.5 7.0 6.0 6.4 6.6
4.7 5.5 5.4 5.3 5.0 5.2 5.0 5.3 5.7 5.8 4.8 6.2 5.1 6.7 8.5 10.5 9.3 10.5 7.9 8.7 10.6 10.4 11.7 9.5 10.8 11.8 13.0 11.0 9.7 8.2 7.7 8.1 6.7 6.8 6.5 5.4
13.2 11.5 11.9 10.4 9.8 9.7 12.6 10.3 9.6 10.8 10.8 12.2 11.3 11.8
12.7 8.3

Figure 20. SATOB 101 - 400 hPa mean daily count. APRIL 2003
Global average number of observations in 24 hours = 233716



		1	3	4	4	1			0	0	1	1				3	4	5	3	2		0	3	3	3										
26	92	73	61	63	67	208	249	132	59	62	110	116	47	65	246	572	630	679	530	429	350	197	141	155	137	99	55	2	0	1	1	1	1	0	0
395	439	271	164	108	269	658	606	696	432	340	415	236	310	744	997	1474	1610	1495	1334	1495	1186	1126	1045	584	465	424	383	276	46	19	15	19	26	22	86
376	655	375	214	134	159	450	489	805	500	551	716	650	1291	2106	2269	2136	1966	1917	1894	1947	2026	2315	2257	1003	564	749	726	672	348	45	39	49	45	70	339
290	466	594	528	420	593	1435	1579	1235	652	565	693	684	1133	1571	1752	1847	2076	2262	2098	1762	1574	2387	1782	655	291	420	628	486	418	29	28	28	19	25	199
561	707	991	1236	1238	1312	1332	1259	360	436	796	730	623	622	1060	1096	967	1178	1578	1816	1261	964	1125	433	141	519	620	376	687	225	40	20	38	45	49	108
516	455	514	690	754	771	874	1101	476	558	828	936	1214	987	1015	800	920	892	1236	1728	1707	1687	1453	1220	900	1070	1141	1243	916	611	178	45	63	58	55	54
612	443	412	304	172	168	73	132	67	79	631	782	1305	1304	1278	789	521	489	1006	1715	1589	1653	1629	1554	1131	1203	1237	1296	1058	732	481	38	39	42	54	49
601	502	490	427	225	90	54	109	69	24	295	511	838	817	895	407	175	40	113	812	723	533	1121	1697	1324	1114	1162	1026	737	503	48	10	29	36	41	134
386	381	380	476	454	479	425	187	142	129	63	134	513	745	783	663	510	368	220	508	748	486	604	1007	975	679	455	498	616	473	43	19	11	13	29	235
176	259	286	285	395	487	637	324	295	253	209	154	227	584	632	698	609	681	692	874	998	814	684	617	688	618	563	466	447	250	37	21	19	15	21	133
54	70	74	62	53	114	169	178	177	183	126	112	115	266	392	370	396	421	464	602	974	937	692	520	472	482	439	421	293	44	27	25	19	15	14	24
													0	51	123	138	169	184	165	195	241	198	244	206	148	118	74	1							
																1	2	1	1			0	2	1	1										

Figure 21. SATOB 101 - 400 hPa vector mean wind. APRIL 2003
All observations
Arrows are plotted where greater than 10 obs are present

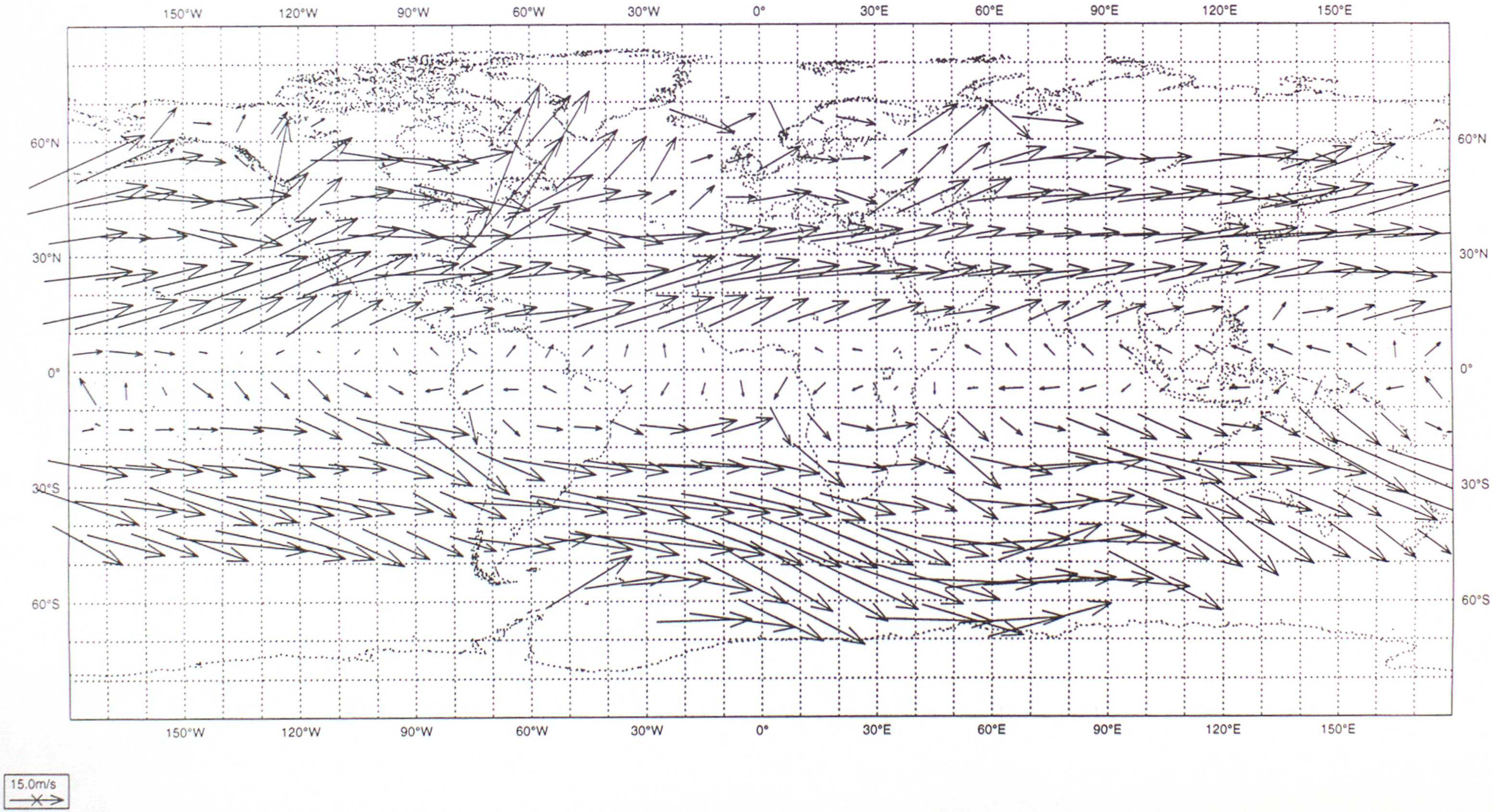

150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S
15.0m/s

Figure 22. SATOB 101 - 400 hPa mean vector wind differences. APRIL 2003
All observations
Arrows are plotted where greater than 10 obs are present

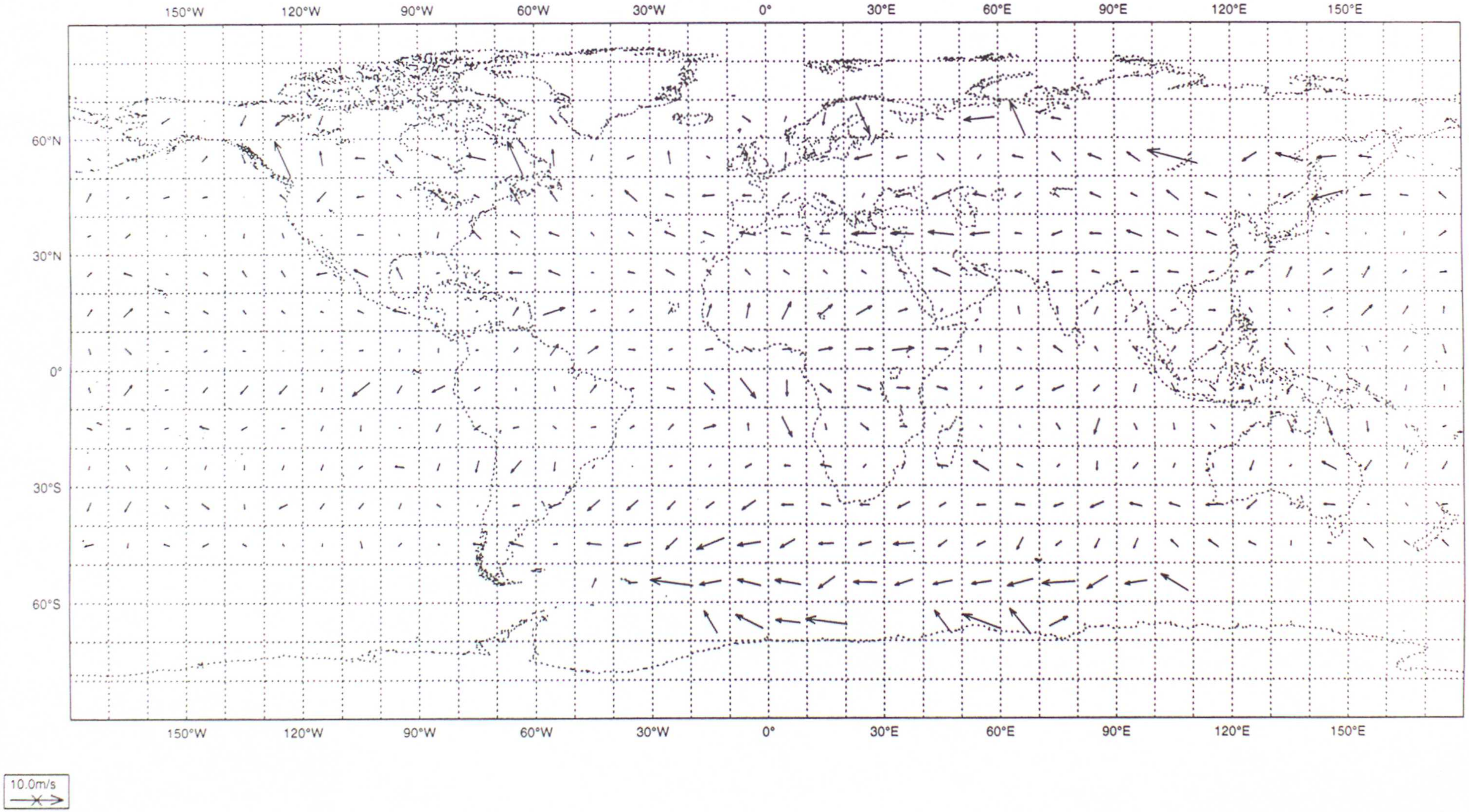

150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S
10.0m/s

Figure 23. SATOB 101 - 400 hPa mean O-B speed differences (ms-1). APRIL 2003
All observations
Values are plotted where greater than 10 obs are present

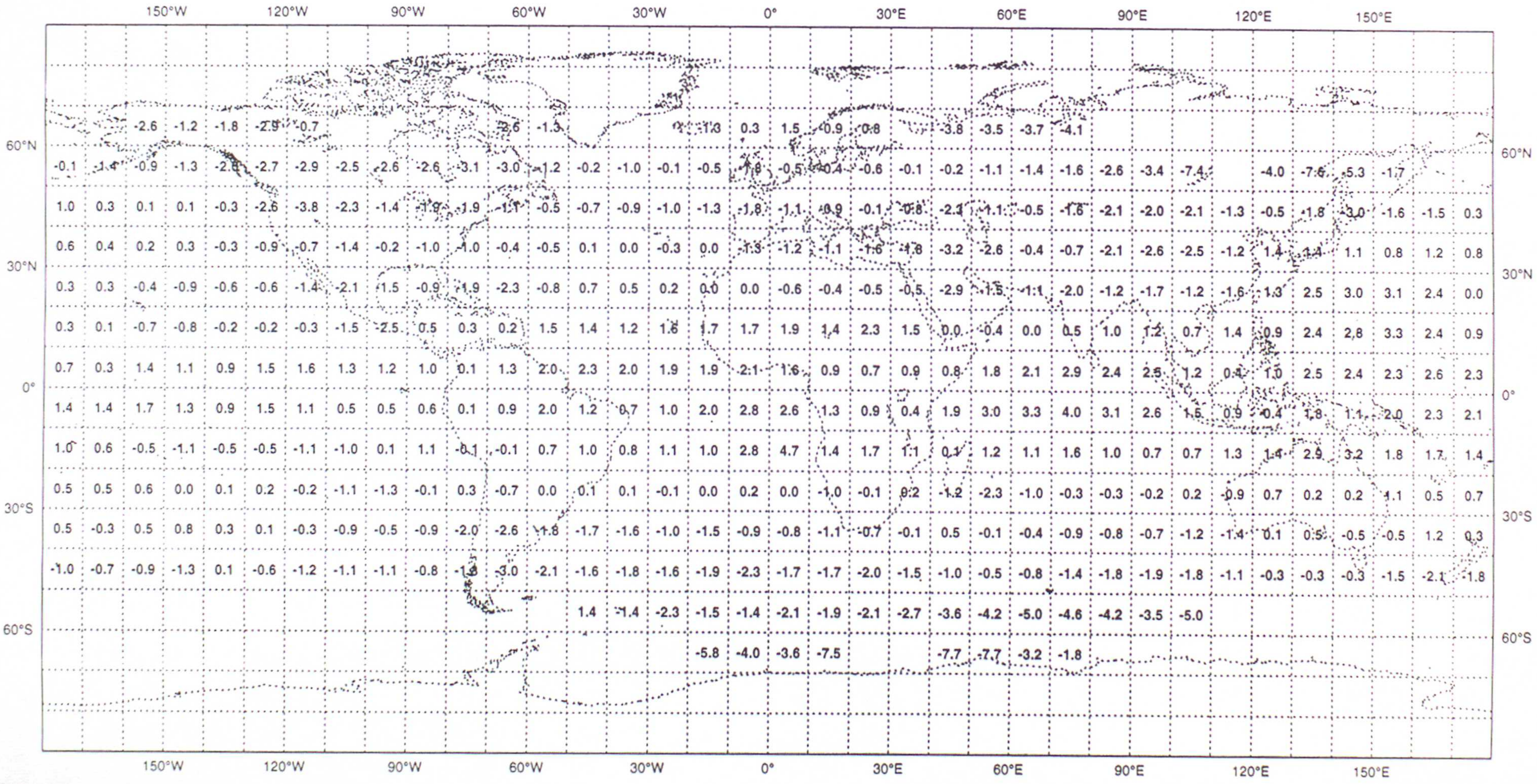
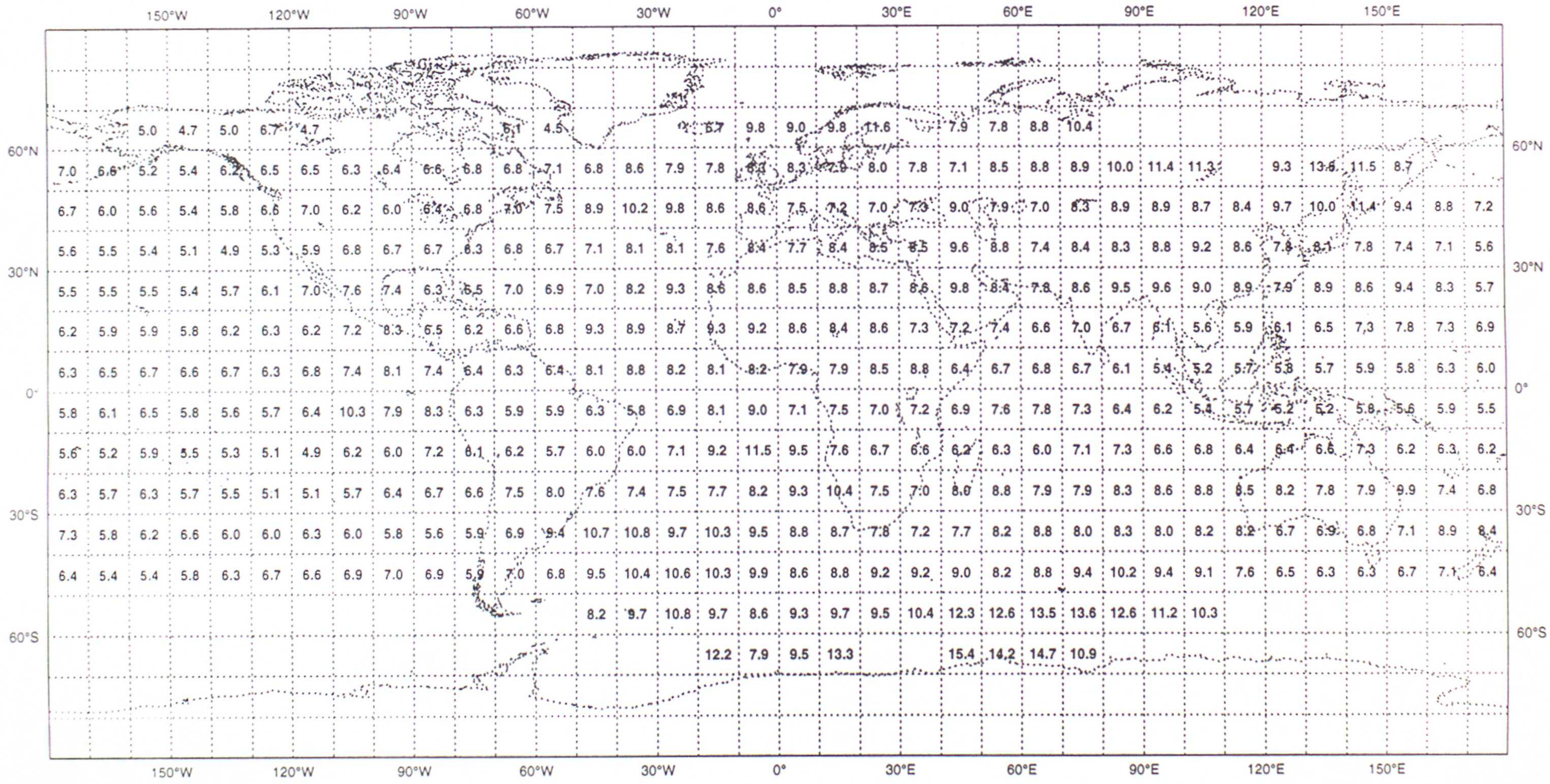

150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S
-2.6 -1.2 -1.8 -2.9 -0.7 -2.6 -1.3 -1.3 0.3 1.5 -0.9 -0.8 -3.8 -3.5 -3.7 -4.1
-0.1 -1.4 -0.9 -1.3 -2.8 -2.7 -2.9 -2.5 -2.6 -2.6 -3.1 -3.0 -1.2 -0.2 -1.0 -0.1 -0.5 -1.8 -0.5 -0.4 -0.6 -0.1 -0.2 -1.1 -1.4 -1.6 -2.6 -3.4 -7.4 -4.0 -7.6 -5.3 -1.7
1.0 0.3 0.1 0.1 -0.3 -2.6 -3.8 -2.3 -1.4 -1.9 -1.9 -1.1 -0.5 -0.7 -0.9 -1.0 -1.3 -1.8 -1.1 -0.9 -0.1 -0.8 -2.1 -1.1 -0.5 -1.6 -2.1 -2.0 -2.1 -1.3 -0.5 -1.8 -3.0 -1.6 -1.5 0.3
0.6 0.4 0.2 0.3 -0.3 -0.9 -0.7 -1.4 -0.2 -1.0 -1.0 -0.4 -0.5 0.1 0.0 -0.3 0.0 -1.3 -1.2 -1.1 -1.6 -1.8 -3.2 -2.6 -0.4 -0.7 -2.1 -2.6 -2.5 -1.2 1.4 1.4 1.1 0.8 1.2 0.8
0.3 0.3 -0.4 -0.9 -0.6 -0.6 -1.4 -2.1 1.5 -0.9 -1.9 -2.3 -0.8 0.7 0.5 0.2 0.0 0.0 -0.6 -0.4 -0.5 -0.5 -2.9 -1.5 -1.1 -2.0 -1.2 -1.7 -1.2 -1.6 1.3 2.5 3.0 3.1 2.4 0.0
0.3 0.1 -0.7 -0.8 -0.2 -0.2 -0.3 -1.5 -2.5 0.5 0.3 0.2 1.5 1.4 1.2 1.6 1.7 1.7 1.9 1.4 2.3 1.5 0.0 -0.4 0.0 0.5 1.0 1.2 0.7 1.4 0.9 2.4 2.8 3.3 2.4 0.9
0.7 0.3 1.4 1.1 0.9 1.5 1.6 1.3 1.2 1.0 0.1 1.3 2.0 2.3 2.0 1.9 1.9 2.1 1.6 0.9 0.7 0.9 0.8 1.8 2.1 2.9 2.4 2.5 1.2 0.4 1.0 2.5 2.4 2.3 2.6 2.3
1.4 1.4 1.7 1.3 0.9 1.5 1.1 0.5 0.5 0.6 0.1 0.9 2.0 1.2 0.7 1.0 2.0 2.8 2.6 1.3 0.9 0.4 1.9 3.0 3.3 4.0 3.1 2.6 1.5 0.9 -0.4 1.8 1.1 2.0 2.3 2.1
1.0 0.6 -0.5 -1.1 -0.5 -0.5 -1.1 -1.0 0.1 1.1 -0.1 -0.1 0.7 1.0 0.8 1.1 1.0 2.8 4.7 1.4 1.7 1.1 0.1 1.2 1.1 1.6 1.0 0.7 0.7 1.3 1.4 2.9 3.2 1.8 1.7 1.4
0.5 0.5 0.6 0.0 0.1 0.2 -0.2 -1.1 -1.3 -0.1 0.3 -0.7 0.0 0.1 0.1 -0.1 0.0 0.2 0.0 -1.0 -0.1 0.2 -1.2 -2.3 -1.0 -0.3 -0.3 -0.2 0.2 -0.9 0.7 0.2 0.2 1.1 0.5 0.7
0.5 -0.3 0.5 0.8 0.3 0.1 -0.3 -0.9 -0.5 -0.9 -2.0 -2.6 -1.8 -1.7 -1.6 -1.0 -1.5 -0.9 -0.8 -1.1 -0.7 -0.1 0.5 -0.1 -0.4 -0.9 -0.8 -0.7 -1.2 -1.4 0.1 0.5 -0.5 -0.5 1.2 0.3
-1.0 -0.7 -0.9 -1.3 0.1 -0.6 -1.2 -1.1 -1.1 -0.8 -1.8 -3.0 -2.1 -1.6 -1.8 -1.6 -1.9 -2.3 -1.7 -1.7 -2.0 -1.5 -1.0 -0.5 -0.8 -1.4 -1.8 -1.9 -1.8 -1.1 -0.3 -0.3 -0.3 -1.5 -2.1 -1.8
1.4 -1.4 -2.3 -1.5 -1.4 -2.1 -1.9 -2.1 -2.7 -3.6 -4.2 -5.0 -4.6 -4.2 -3.5 -5.0
-5.8 -4.0 -3.6 -7.5 -7.7 -7.7 -3.2 -1.8

Figure 24. SATOB 101 - 400 hPa mean RMS O-B vector differences (ms-1). APRIL 2003
All observations
Values are plotted where greater than 10 obs are present


150°W 120°W 90°W 60°W 30°W 0° 30°E 60°E 90°E 120°E 150°E
60°N 30°N 0° 30°S 60°S
5.0 4.7 5.0 6.7 4.7 5.1 4.5 5.7 9.8 9.0 9.8 11.6 7.9 7.8 8.8 10.4
7.0 6.6 5.2 5.4 6.2 6.5 6.5 6.3 6.4 6.6 6.8 6.8 7.1 6.8 8.6 7.9 7.8 8.4 8.3 7.9 8.0 7.8 7.1 8.5 8.8 8.9 10.0 11.4 11.3 9.3 13.6 11.5 8.7
6.7 6.0 5.6 5.4 5.8 6.6 7.0 6.2 6.0 6.4 6.8 7.0 7.5 8.9 10.2 9.8 8.6 8.6 7.5 7.2 7.0 7.3 9.0 7.9 7.0 8.3 8.9 8.9 8.7 8.4 9.7 10.0 11.4 9.4 8.8 7.2
5.6 5.5 5.4 5.1 4.9 5.3 5.9 6.8 6.7 6.7 6.3 6.8 6.7 7.1 8.1 8.1 7.6 8.4 7.7 8.4 8.5 8.5 9.6 8.8 7.4 8.4 8.3 8.8 9.2 8.6 7.8 8.1 7.8 7.4 7.1 5.6
5.5 5.5 5.5 5.4 5.7 6.1 7.0 7.6 7.4 6.3 6.5 7.0 6.9 7.0 8.2 9.3 8.6 8.6 8.5 8.8 8.7 8.6 9.8 8.4 7.8 8.6 9.5 9.6 9.0 8.9 7.9 8.9 8.6 9.4 8.3 5.7
6.2 5.9 5.9 5.8 6.2 6.3 6.2 7.2 8.3 6.5 6.2 6.6 6.8 9.3 8.9 8.7 9.3 9.2 8.6 8.4 8.6 7.3 7.2 7.4 6.6 7.0 6.7 6.1 5.6 5.9 6.1 6.5 7.3 7.8 7.3 6.9
6.3 6.5 6.7 6.6 6.7 6.3 6.8 7.4 8.1 7.4 6.4 6.3 6.4 8.1 8.8 8.2 8.1 8.2 7.9 7.9 8.5 8.8 6.4 6.7 6.8 6.7 6.1 5.4 5.2 5.7 5.8 5.7 5.9 5.8 6.3 6.0
5.8 6.1 6.5 5.8 5.6 5.7 6.4 10.3 7.9 8.3 6.3 5.9 5.9 6.3 5.8 6.9 8.1 9.0 7.1 7.5 7.0 7.2 6.9 7.6 7.8 7.3 6.4 6.2 5.4 5.7 6.2 5.2 5.8 5.6 5.9 5.5
5.6 5.2 5.9 5.5 5.3 5.1 4.9 6.2 6.0 7.2 6.1 6.2 5.7 6.0 6.0 7.1 9.2 11.5 9.5 7.6 6.7 6.6 6.2 6.3 6.0 7.1 7.3 6.6 6.8 6.4 6.4 6.6 7.3 6.2 6.3 6.2
6.3 5.7 6.3 5.7 5.5 5.1 5.1 5.7 6.4 6.7 6.6 7.5 8.0 7.6 7.4 7.5 7.7 8.2 9.3 10.4 7.5 7.0 8.0 8.8 7.9 7.9 8.3 8.6 8.8 8.5 8.2 7.8 7.9 9.9 7.4 6.8
7.3 5.8 6.2 6.6 6.0 6.0 6.3 6.0 5.8 5.6 5.9 6.9 9.4 10.7 10.8 9.7 10.3 9.5 8.8 8.7 7.8 7.2 7.7 8.2 8.8 8.0 8.3 8.0 8.2 8.2 6.7 6.9 6.8 7.1 8.9 8.4
6.4 5.4 5.4 5.8 6.3 6.7 6.6 6.9 7.0 6.9 5.9 7.0 6.8 9.5 10.4 10.6 10.3 9.9 8.6 8.8 9.2 9.2 9.0 8.2 8.8 9.4 10.2 9.4 9.1 7.6 6.5 6.3 6.3 6.7 7.1 6.4
8.2 9.7 10.8 9.7 8.6 9.3 9.7 9.5 10.4 12.3 12.6 13.5 13.6 12.6 11.2 10.3
12.2 7.9 9.5 13.3 15.4 14.2 14.7 10.9

MONITORING OF SATELLITE TEMPERATURES

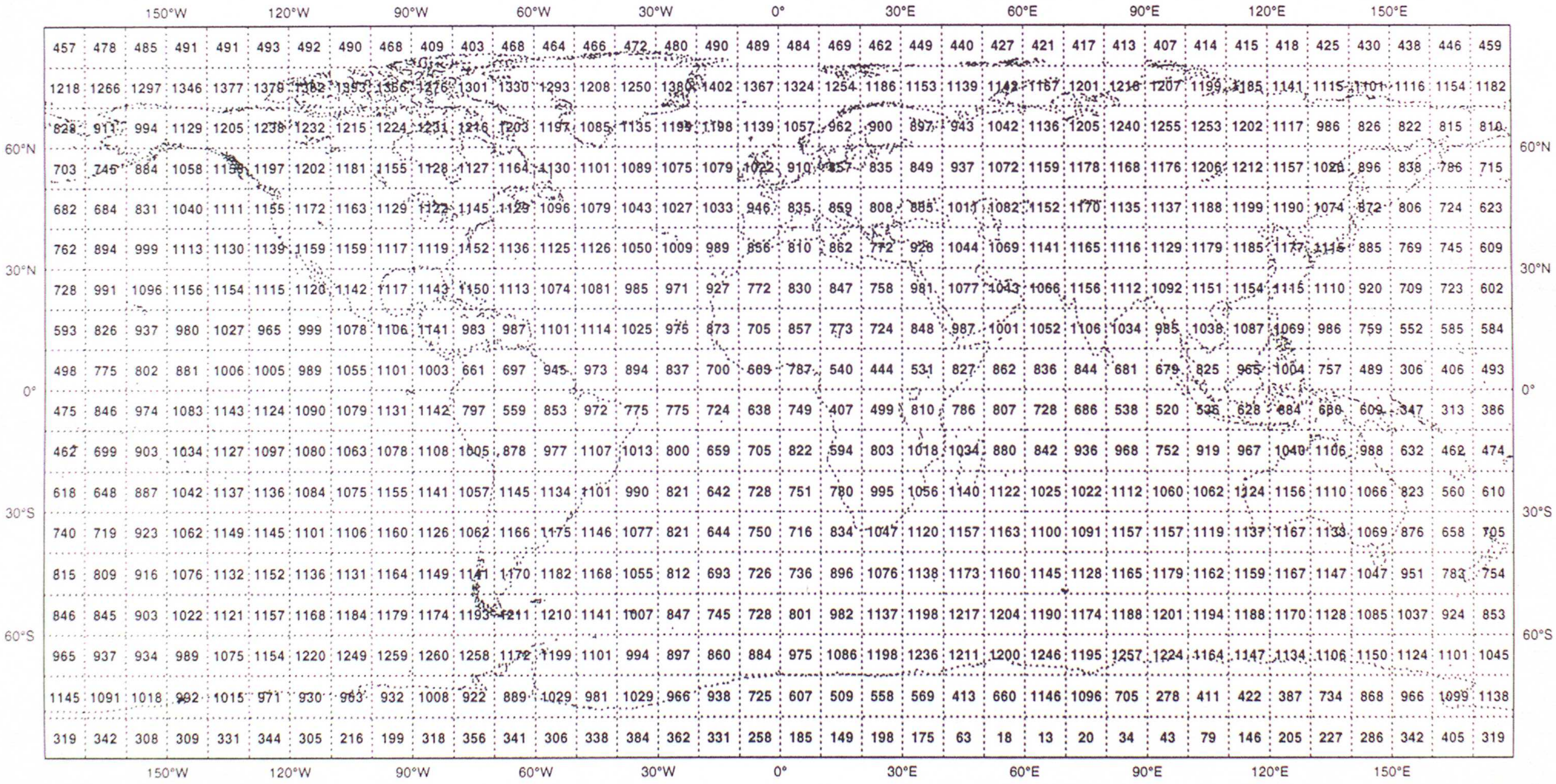
MONITORING CENTRE: BRACKNELL

MONTH: April 2003

Monitoring procedures

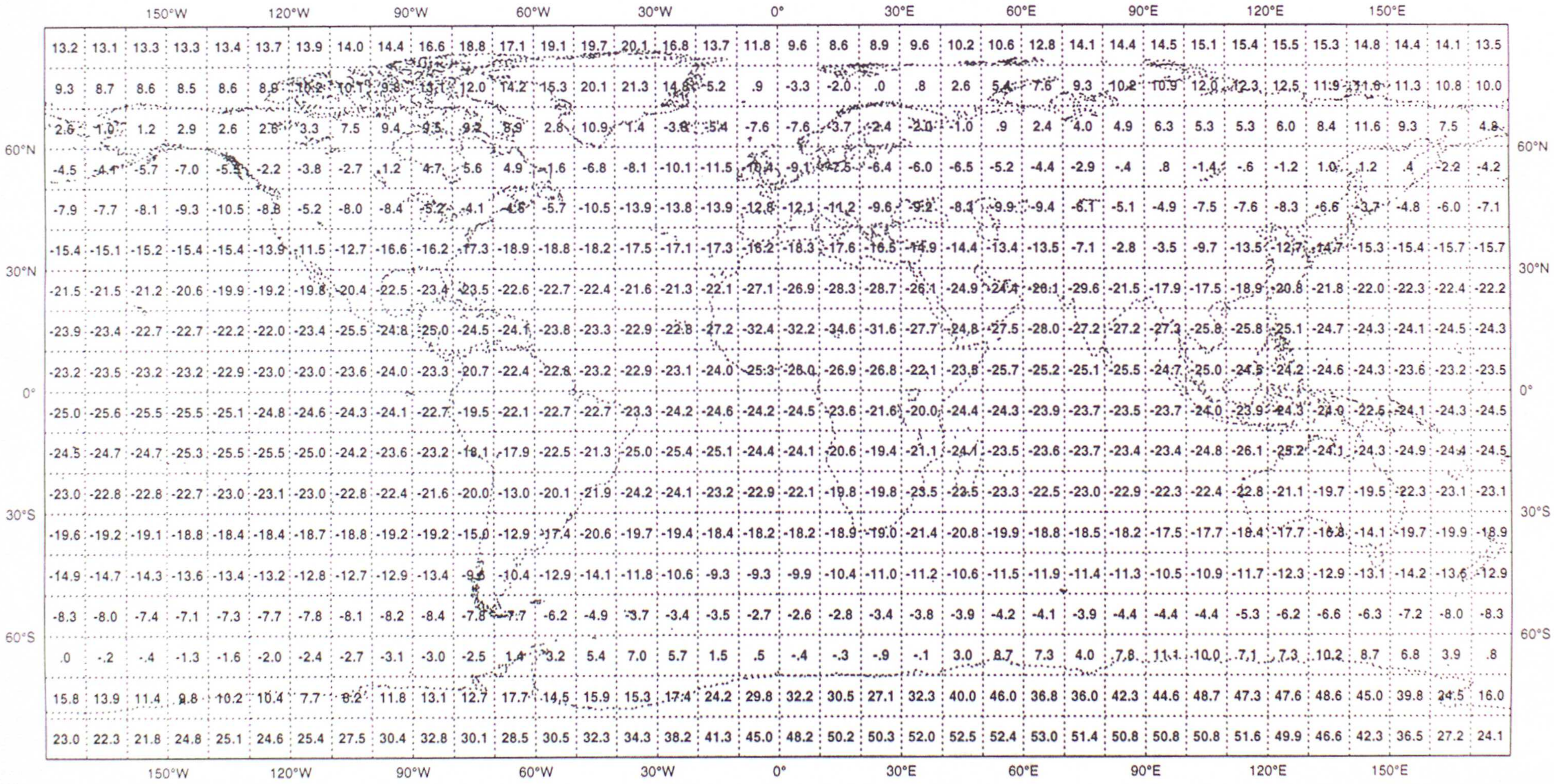
Period	:One calendar month.
Data monitored	:Reports from NOAA-15, NOAA-16 and NOAA-17.
Standard of comparison	:Background field from UKMO global model.
Selection Criteria	:All soundings.
Data Extracted	:Sounding channels (and approximate weighting function peaks, hPa) HIRS8 (Surface) HIRS15 (700) HIRS11 (500-700) HIRS4 (400) AMSUA5 (700) AMSUA7 (300) AMSUA9 (100)
	:Mean and standard deviation observation-minus-background brightness temperature differences

Figure 25. ATOVS mean daily count. APRIL 2003
NOAA15, using all observations
Global average number of observations in 24 hours = 593557



457	478	485	491	491	493	492	490	468	409	403	468	464	466	472	480	490	489	484	469	462	449	440	427	421	417	413	407	414	415	418	425	430	438	446	459
1218	1266	1297	1346	1377	1378	1382	1393	1356	1276	1301	1330	1293	1208	1250	1380	1402	1367	1324	1254	1186	1153	1139	1142	1167	1201	1216	1207	1199	1185	1141	1115	1101	1116	1154	1182
828	911	994	1129	1205	1238	1232	1215	1224	1231	1216	1203	1197	1085	1135	1199	1198	1139	1057	962	900	897	943	1042	1136	1205	1240	1255	1253	1202	1117	986	826	822	815	810
703	745	884	1058	1158	1197	1202	1181	1155	1128	1127	1164	1130	1101	1089	1075	1079	1022	910	857	835	849	937	1072	1159	1178	1168	1176	1206	1212	1157	1026	896	838	786	715
682	684	831	1040	1111	1155	1172	1163	1129	1122	1145	1129	1096	1079	1043	1027	1033	946	835	859	808	885	1011	1082	1152	1170	1135	1137	1188	1199	1190	1074	872	806	724	623
762	894	999	1113	1130	1139	1159	1159	1117	1119	1152	1136	1125	1126	1050	1009	989	856	810	862	772	928	1044	1069	1141	1165	1116	1129	1179	1185	1177	1115	885	769	745	609
728	991	1096	1156	1154	1115	1120	1142	1117	1143	1150	1113	1074	1081	985	971	927	772	830	847	758	981	1077	1043	1066	1156	1112	1092	1151	1154	1115	1110	920	709	723	602
593	826	937	980	1027	965	999	1078	1106	1141	983	987	1101	1114	1025	975	873	705	857	773	724	848	987	1001	1052	1106	1034	985	1038	1087	1069	986	759	552	585	584
498	775	802	881	1006	1005	989	1055	1101	1003	661	697	945	973	894	837	700	689	787	540	444	531	827	862	836	844	681	679	825	965	1004	757	489	306	406	493
475	846	974	1083	1143	1124	1090	1079	1131	1142	797	559	853	972	775	775	724	638	749	407	499	810	786	807	728	686	538	520	536	628	684	680	609	347	313	386
462	699	903	1034	1127	1097	1080	1063	1078	1108	1005	878	977	1107	1013	800	659	705	822	594	803	1018	1034	880	842	936	968	752	919	967	1040	1106	988	632	462	474
618	648	887	1042	1137	1136	1084	1075	1155	1141	1057	1145	1134	1101	990	821	642	728	751	780	995	1056	1140	1122	1025	1022	1112	1060	1062	1124	1156	1110	1066	823	560	610
740	719	923	1062	1149	1145	1101	1106	1160	1126	1062	1166	1175	1146	1077	821	644	750	716	834	1047	1120	1157	1163	1100	1091	1157	1157	1119	1137	1167	1133	1069	876	658	705
815	809	916	1076	1132	1152	1136	1131	1164	1149	1141	1170	1182	1168	1055	812	693	726	736	896	1076	1138	1173	1160	1145	1128	1165	1179	1162	1159	1167	1147	1047	951	783	754
846	845	903	1022	1121	1157	1168	1184	1179	1174	1193	1211	1210	1141	1007	847	745	728	801	982	1137	1198	1217	1204	1190	1174	1188	1201	1194	1188	1170	1128	1085	1037	924	853
965	937	934	989	1075	1154	1220	1249	1259	1260	1258	1172	1199	1101	994	897	860	884	975	1086	1198	1236	1211	1200	1246	1195	1257	1224	1164	1147	1134	1106	1150	1124	1101	1045
1145	1091	1018	982	1015	971	930	963	932	1008	922	889	1029	981	1029	966	938	725	607	509	558	569	413	660	1146	1096	705	278	411	422	387	734	868	966	1099	1138
319	342	308	309	331	344	305	216	199	318	356	341	306	338	384	362	331	258	185	149	198	175	63	18	13	20	34	43	79	146	205	227	286	342	405	319

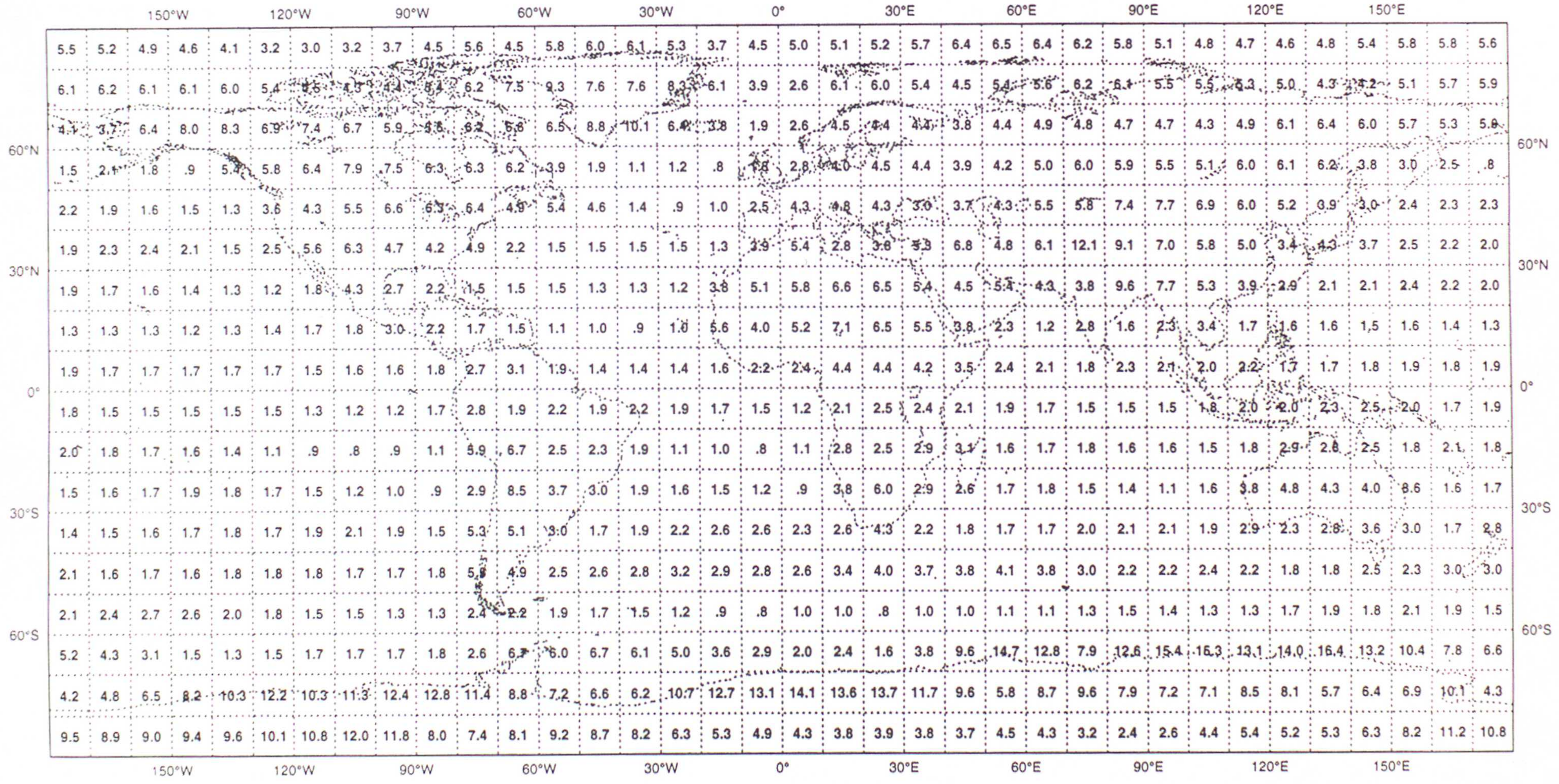
Figure 26. ATOVS MEAN O-B brightness temperature differences (deg C). APRIL 2003
Channel: HIRS8 (Surface)
NOAA15, using all observations



13.2	13.1	13.3	13.3	13.4	13.7	13.9	14.0	14.4	16.6	18.8	17.1	19.1	19.7	20.1	16.8	13.7	11.8
9.3	8.7	8.6	8.5	8.6	8.9	10.2	10.1	9.8	13.1	12.0	14.2	15.3	20.1	21.3	14.8	-5.2	.9
2.6	1.0	1.2	2.9	2.6	2.6	3.3	7.5	9.4	9.5	9.2	8.9	2.8	10.9	1.4	-3.8	-5.4	-7.6
-4.5	-4.4	-5.7	-7.0	-5.5	-2.2	-3.8	-2.7	1.2	4.7	5.6	4.9	-1.6	-6.8	-8.1	-10.1	-11.5	-10.4
-7.9	-7.7	-8.1	-9.3	-10.5	-8.8	-5.2	-8.0	-8.4	-5.2	-4.1	-4.6	-5.7	-10.5	-13.9	-13.8	-13.9	-12.8
-15.4	-15.1	-15.2	-15.4	-15.4	-13.9	-11.5	-12.7	-16.6	-16.2	-17.3	-18.9	-18.8	-18.2	-17.5	-17.1	-17.3	-16.2
-21.5	-21.5	-21.2	-20.6	-19.9	-19.2	-19.8	-20.4	-22.5	-23.4	-23.5	-22.6	-22.7	-22.4	-21.6	-21.3	-22.1	-27.1
-23.9	-23.4	-22.7	-22.7	-22.2	-22.0	-23.4	-25.5	-24.8	-25.0	-24.5	-24.1	-23.8	-23.3	-22.9	-22.8	-27.2	-32.4
-23.2	-23.5	-23.2	-23.2	-22.9	-23.0	-23.0	-23.6	-24.0	-23.3	-20.7	-22.4	-22.8	-23.2	-22.9	-23.1	-24.0	-25.3
-25.0	-25.6	-25.5	-25.5	-25.1	-24.8	-24.6	-24.3	-24.1	-22.7	-19.5	-22.1	-22.7	-22.7	-23.3	-24.2	-24.6	-24.2
-24.5	-24.7	-24.7	-25.3	-25.5	-25.5	-25.0	-24.2	-23.6	-23.2	-18.1	-17.9	-22.5	-21.3	-25.0	-25.4	-25.1	-24.4
-23.0	-22.8	-22.8	-22.7	-23.0	-23.1	-23.0	-22.8	-22.4	-21.6	-20.0	-13.0	-20.1	-21.9	-24.2	-24.1	-23.2	-22.9
-19.6	-19.2	-19.1	-18.8	-18.4	-18.4	-18.7	-18.8	-19.2	-19.2	-15.0	-12.9	-17.4	-20.6	-19.7	-19.4	-18.4	-18.2
-14.9	-14.7	-14.3	-13.6	-13.4	-13.2	-12.8	-12.7	-12.9	-13.4	-9.6	-10.4	-12.9	-14.1	-11.8	-10.6	-9.3	-9.3
-8.3	-8.0	-7.4	-7.1	-7.3	-7.7	-7.8	-8.1	-8.2	-8.4	-7.8	-7.7	-6.2	-4.9	-3.7	-3.4	-3.5	-2.7
.0	-.2	-.4	-1.3	-1.6	-2.0	-2.4	-2.7	-3.1	-3.0	-2.5	1.4	3.2	5.4	7.0	5.7	1.5	.5
15.8	13.9	11.4	9.8	10.2	10.4	7.7	8.2	11.8	13.1	12.7	17.7	14.5	15.9	15.3	17.4	24.2	29.8
23.0	22.3	21.8	24.8	25.1	24.6	25.4	27.5	30.4	32.8	30.1	28.5	30.5	32.3	34.3	38.2	41.3	45.0

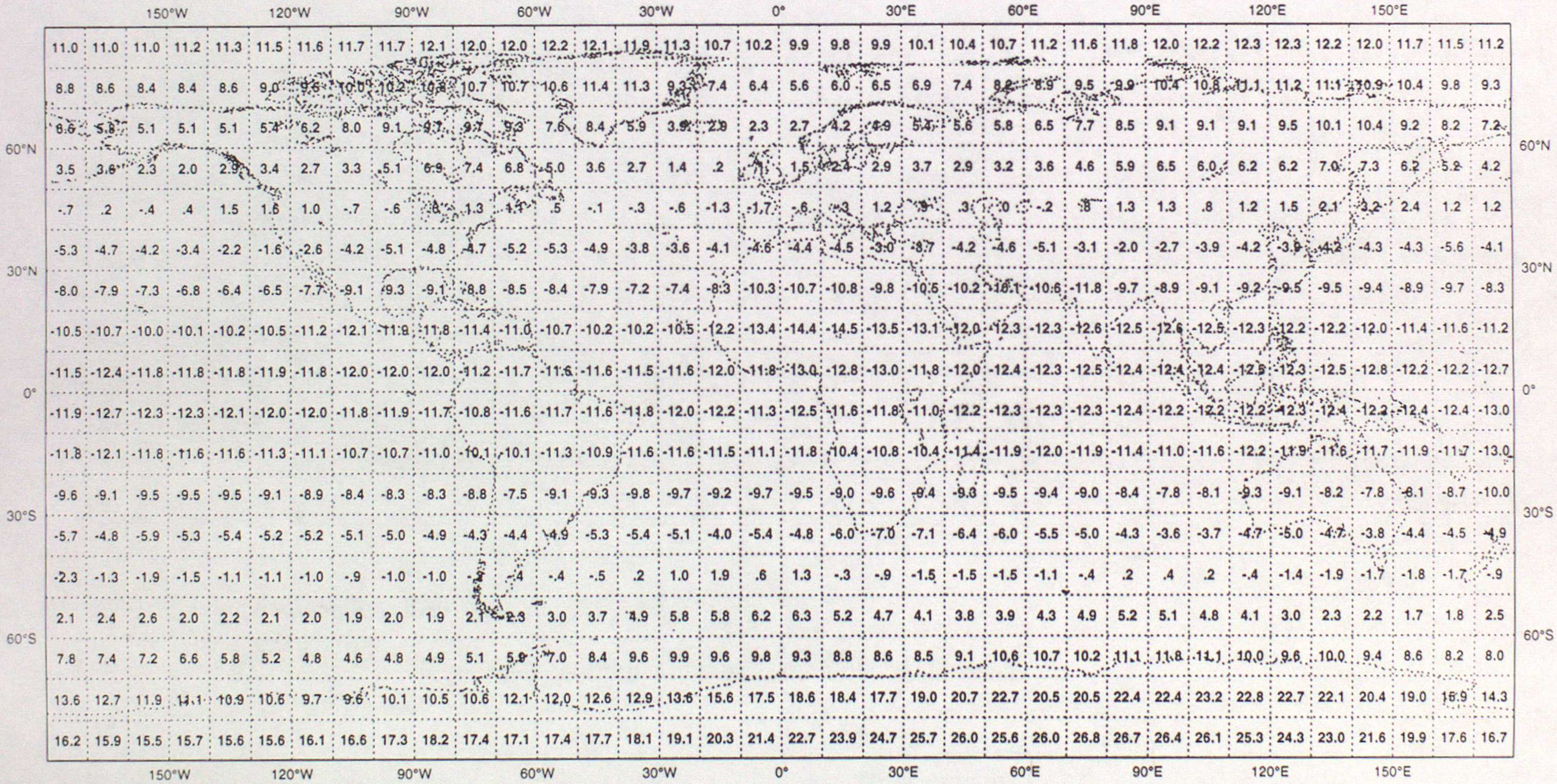
9.6	8.6	8.9	9.6	10.2	10.6	12.8	14.1	14.4	14.5	15.1	15.4	15.5	15.3	14.8	14.4	14.1	13.5
-3.3	-2.0	.0	.8	2.6	5.4	7.6	9.3	10.2	10.9	12.0	12.3	12.5	11.9	11.6	11.3	10.8	10.0
-7.6	-3.7	-2.4	-2.0	-1.0	.9	2.4	4.0	4.9	6.3	5.3	5.3	6.0	8.4	11.6	9.3	7.5	4.8
-9.1	-12.5	-6.4	-6.0	-6.5	-5.2	-4.4	-2.9	-.4	.8	-1.4	-.6	-1.2	1.0	1.2	.4	-2.2	-4.2
-12.1	-11.2	-9.6	-9.2	-8.3	-9.9	-9.4	-6.1	-5.1	-4.9	-7.5	-7.6	-8.3	-6.6	-3.7	-4.8	-6.0	-7.1
-18.3	-17.6	-16.5	-14.9	-14.4	-13.4	-13.5	-7.1	-2.8	-3.5	-9.7	-13.5	-12.7	-14.7	-15.3	-15.4	-15.7	-15.7
-26.9	-28.3	-28.7	-26.1	-24.9	-24.4	-26.1	-29.6	-21.5	-17.9	-17.5	-18.9	-20.8	-21.8	-22.0	-22.3	-22.4	-22.2
-32.2	-34.6	-31.6	-27.7	-24.8	-27.5	-28.0	-27.2	-27.2	-27.3	-25.8	-25.8	-25.1	-24.7	-24.3	-24.1	-24.5	-24.3
-26.0	-26.9	-26.8	-22.1	-23.8	-25.7	-25.2	-25.1	-25.5	-24.7	-25.0	-24.5	-24.2	-24.6	-24.3	-23.6	-23.2	-23.5
-24.5	-23.6	-21.6	-20.0	-24.4	-24.3	-23.9	-23.7	-23.5	-23.7	-24.0	-23.9	-24.3	-24.0	-22.5	-24.1	-24.3	-24.5
-24.1	-20.6	-19.4	-21.1	-24.1	-23.5	-23.6	-23.7	-23.4	-23.4	-24.8	-26.1	-25.2	-24.1	-24.3	-24.9	-24.4	-24.5
-22.1	-19.8	-19.8	-23.5	-23.5	-23.3	-22.5	-23.0	-22.9	-22.3	-22.4	-22.8	-21.1	-19.7	-19.5	-22.3	-23.1	-23.1
-18.2	-18.9	-19.0	-21.4	-20.8	-19.9	-18.8	-18.5	-18.2	-17.5	-17.7	-18.4	-17.7	-16.8	-14.1	-19.7	-19.9	-18.9
-9.9	-10.4	-11.0	-11.2	-10.6	-11.5	-11.9	-11.4	-11.3	-10.5	-10.9	-11.7	-12.3	-12.9	-13.1	-14.2	-13.6	-12.9
-2.6	-2.8	-3.4	-3.8	-3.9	-4.2	-4.1	-3.9	-4.4	-4.4	-4.4	-5.3	-6.2	-6.6	-6.3	-7.2	-8.0	-8.3
-.4	-.3	-.9	-.1	3.0	8.7	7.3	4.0	7.8	11.1	10.0	7.1	7.3	10.2	8.7	6.8	3.9	.8
32.2	30.5	27.1	32.3	40.0	46.0	36.8	36.0	42.3	44.6	48.7	47.3	47.6	48.6	45.0	39.8	24.5	16.0
48.2	50.2	50.3	52.0	52.5	52.4	53.0	51.4	50.8	50.8	50.8	51.6	49.9	46.6	42.3	36.5	27.2	24.1

Figure 27. ATOVS SD O-B brightness temperature differences (deg C). APRIL 2003
Channel: HIRS8 (Surface)
NOAA15, using all observations



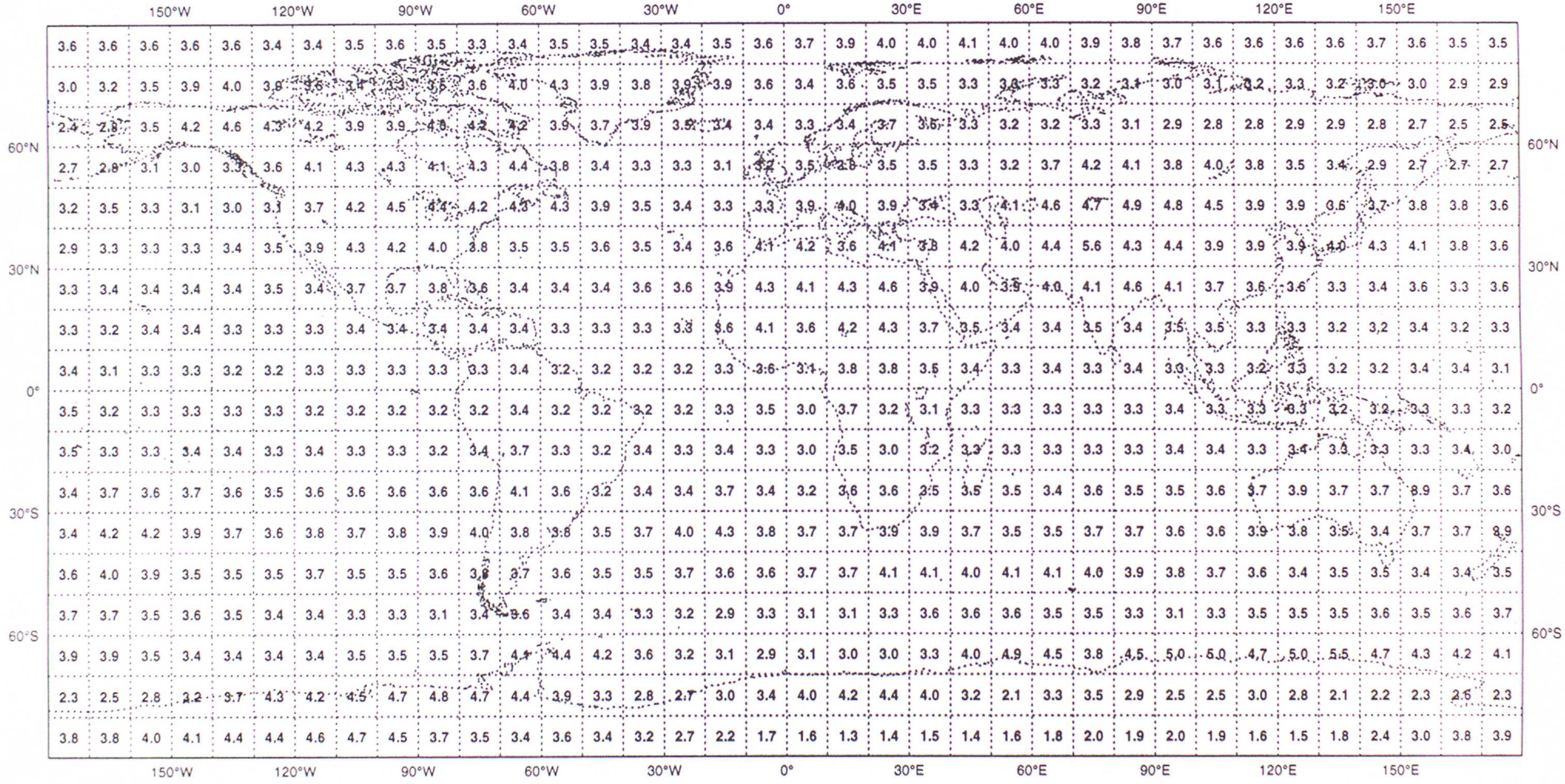
5.5	5.2	4.9	4.6	4.1	3.2	3.0	3.2	3.7	4.5	5.6	4.5	5.8	6.0	6.1	5.3	3.7	4.5	5.0	5.1	5.2	5.7	6.4	6.5	6.4	6.2	5.8	5.1	4.8	4.7	4.6	4.8	5.4	5.8	5.8	5.6
6.1	6.2	6.1	6.1	6.0	5.4	4.6	4.3	4.4	8.4	6.2	7.5	9.3	7.6	7.6	8.3	6.1	3.9	2.6	6.1	6.0	5.4	4.5	5.4	5.6	6.2	6.1	5.5	5.5	6.3	5.0	4.3	4.2	5.1	5.7	5.9
4.1	3.7	6.4	8.0	8.3	6.9	7.4	6.7	5.9	5.6	6.2	5.8	6.5	8.8	10.1	6.4	3.8	1.9	2.6	4.5	4.4	4.4	3.8	4.4	4.9	4.8	4.7	4.7	4.3	4.9	6.1	6.4	6.0	5.7	5.3	5.8
1.5	2.1	1.8	.9	5.4	5.8	6.4	7.9	7.5	6.3	6.3	6.2	3.9	1.9	1.1	1.2	.8	1.8	2.8	4.0	4.5	4.4	3.9	4.2	5.0	6.0	5.9	5.5	5.1	6.0	6.1	6.2	3.8	3.0	2.5	.8
2.2	1.9	1.6	1.5	1.3	3.6	4.3	5.5	6.6	6.3	6.4	4.9	5.4	4.6	1.4	.9	1.0	2.5	4.3	4.8	4.3	3.0	3.7	4.3	5.5	5.8	7.4	7.7	6.9	6.0	5.2	3.9	3.0	2.4	2.3	2.3
1.9	2.3	2.4	2.1	1.5	2.5	5.6	6.3	4.7	4.2	4.9	2.2	1.5	1.5	1.5	1.5	1.3	3.9	5.4	2.8	3.6	5.3	6.8	4.8	6.1	12.1	9.1	7.0	5.8	5.0	3.4	4.3	3.7	2.5	2.2	2.0
1.9	1.7	1.6	1.4	1.3	1.2	1.8	4.3	2.7	2.2	1.5	1.5	1.5	1.3	1.3	1.2	3.8	5.1	5.8	6.6	6.5	5.4	4.5	5.4	4.3	3.8	9.6	7.7	5.3	3.9	2.9	2.1	2.1	2.4	2.2	2.0
1.3	1.3	1.3	1.2	1.3	1.4	1.7	1.8	3.0	2.2	1.7	1.5	1.1	1.0	.9	1.0	5.6	4.0	5.2	7.1	6.5	5.5	3.8	2.3	1.2	2.8	1.6	2.3	3.4	1.7	1.6	1.6	1.5	1.6	1.4	1.3
1.9	1.7	1.7	1.7	1.7	1.7	1.5	1.6	1.6	1.8	2.7	3.1	1.9	1.4	1.4	1.4	1.6	2.2	2.4	4.4	4.4	4.2	3.5	2.4	2.1	1.8	2.3	2.1	2.0	2.2	1.7	1.7	1.8	1.9	1.8	1.9
1.8	1.5	1.5	1.5	1.5	1.5	1.3	1.2	1.2	1.7	2.8	1.9	2.2	1.9	2.2	1.9	1.7	1.5	1.2	2.1	2.5	2.4	2.1	1.9	1.7	1.5	1.5	1.5	1.8	2.0	2.0	2.3	2.5	2.0	1.7	1.9
2.0	1.8	1.7	1.6	1.4	1.1	.9	.8	.9	1.1	5.9	6.7	2.5	2.3	1.9	1.1	1.0	.8	1.1	2.8	2.5	2.9	3.1	1.6	1.7	1.8	1.6	1.6	1.5	1.8	2.9	2.8	2.5	1.8	2.1	1.8
1.5	1.6	1.7	1.9	1.8	1.7	1.5	1.2	1.0	.9	2.9	8.5	3.7	3.0	1.9	1.6	1.5	1.2	.9	3.8	6.0	2.9	2.6	1.7	1.8	1.5	1.4	1.1	1.6	3.8	4.8	4.3	4.0	8.6	1.6	1.7
1.4	1.5	1.6	1.7	1.8	1.7	1.9	2.1	1.9	1.5	5.3	5.1	3.0	1.7	1.9	2.2	2.6	2.6	2.3	2.6	4.3	2.2	1.8	1.7	1.7	2.0	2.1	2.1	1.9	2.9	2.3	2.8	3.6	3.0	1.7	2.8
2.1	1.6	1.7	1.6	1.8	1.8	1.8	1.7	1.7	1.8	5.8	4.9	2.5	2.6	2.8	3.2	2.9	2.8	2.6	3.4	4.0	3.7	3.8	4.1	3.8	3.0	2.2	2.2	2.4	2.2	1.8	1.8	2.5	2.3	3.0	3.0
2.1	2.4	2.7	2.6	2.0	1.8	1.5	1.5	1.3	1.3	2.4	2.2	1.9	1.7	1.5	1.2	.9	.8	1.0	1.0	.8	1.0	1.0	1.1	1.1	1.3	1.5	1.4	1.3	1.3	1.7	1.9	1.8	2.1	1.9	1.5
5.2	4.3	3.1	1.5	1.3	1.5	1.7	1.7	1.7	1.8	2.6	6.7	6.0	6.7	6.1	5.0	3.6	2.9	2.0	2.4	1.6	3.8	9.6	14.7	12.8	7.9	12.6	15.4	16.3	13.1	14.0	16.4	13.2	10.4	7.8	6.6
4.2	4.8	6.5	8.2	10.3	12.2	10.3	11.3	12.4	12.8	11.4	8.8	7.2	6.6	6.2	10.7	12.7	13.1	14.1	13.6	13.7	11.7	9.6	5.8	8.7	9.6	7.9	7.2	7.1	8.5	8.1	5.7	6.4	6.9	10.1	4.3
9.5	8.9	9.0	9.4	9.6	10.1	10.8	12.0	11.8	8.0	7.4	8.1	9.2	8.7	8.2	6.3	5.3	4.9	4.3	3.8	3.9	3.8	3.7	4.5	4.3	3.2	2.4	2.6	4.4	5.4	5.2	5.3	6.3	8.2	11.2	10.8

Figure 28. ATOVS MEAN O-B brightness temperature differences (deg C). APRIL 2003
Channel: HIRS15 (700 hPa)
NOAA15, using all observations



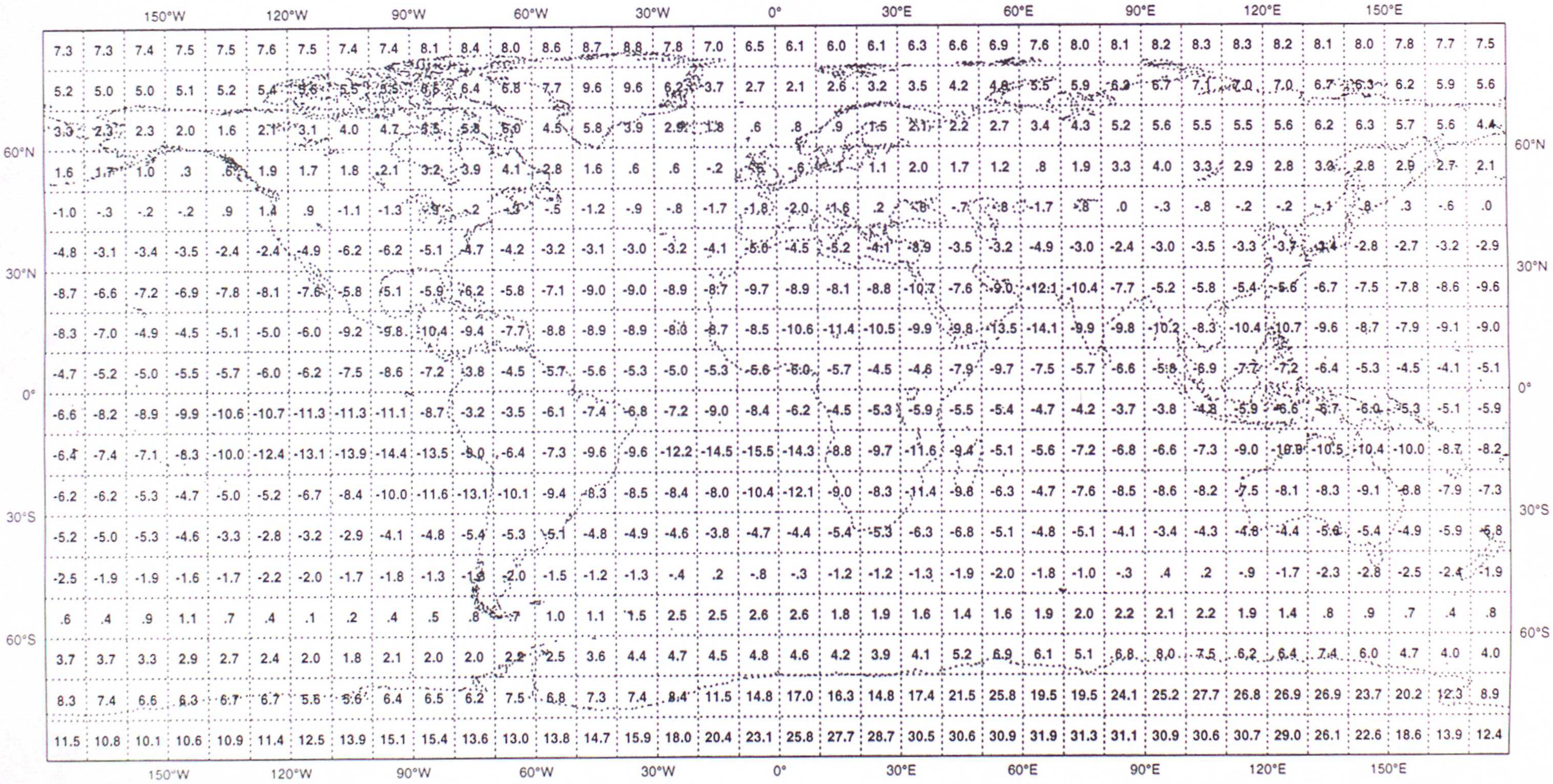
11.0	11.0	11.0	11.2	11.3	11.5	11.6	11.7	11.7	12.1	12.0	12.0	12.2	12.1	11.9	11.3	10.7	10.2	9.9	9.8	9.9	10.1	10.4	10.7	11.2	11.6	11.8	12.0	12.2	12.3	12.3	12.2	12.0	11.7	11.5	11.2
8.8	8.6	8.4	8.4	8.6	9.0	9.6	10.0	10.2	10.8	10.7	10.7	10.6	11.4	11.3	9.3	7.4	6.4	5.6	6.0	6.5	6.9	7.4	8.2	8.9	9.5	9.9	10.4	10.8	11.1	11.2	11.1	10.9	10.4	9.8	9.3
6.6	5.8	5.1	5.1	5.1	5.4	6.2	8.0	9.1	9.7	9.7	9.3	7.6	8.4	5.9	3.9	2.9	2.3	2.7	4.2	4.9	5.4	5.6	5.8	6.5	7.7	8.5	9.1	9.1	9.1	9.5	10.1	10.4	9.2	8.2	7.2
3.5	3.6	2.3	2.0	2.9	3.4	2.7	3.3	5.1	6.9	7.4	6.8	5.0	3.6	2.7	1.4	.2	.7	1.5	2.4	2.9	3.7	2.9	3.2	3.6	4.6	5.9	6.5	6.0	6.2	6.2	7.0	7.3	6.2	5.2	4.2
-.7	.2	-.4	.4	1.5	1.6	1.0	-.7	-.6	.8	1.3	1.1	.5	-.1	-.3	-.6	-1.3	-1.7	-.6	-.3	1.2	.9	.3	.0	-.2	.8	1.3	1.3	.8	1.2	1.5	2.1	3.2	2.4	1.2	1.2
-5.3	-4.7	-4.2	-3.4	-2.2	-1.6	-2.6	-4.2	-5.1	-4.8	-4.7	-5.2	-5.3	-4.9	-3.8	-3.6	-4.1	-4.6	-4.4	-4.5	-3.0	-8.7	-4.2	-4.6	-5.1	-3.1	-2.0	-2.7	-3.9	-4.2	-3.9	-4.2	-4.3	-4.3	-5.6	-4.1
-8.0	-7.9	-7.3	-6.8	-6.4	-6.5	-7.7	-9.1	-9.3	-9.1	-8.8	-8.5	-8.4	-7.9	-7.2	-7.4	-8.3	-10.3	-10.7	-10.8	-9.8	-10.5	-10.2	-10.1	-10.6	-11.8	-9.7	-8.9	-9.1	-9.2	-9.5	-9.5	-9.4	-8.9	-9.7	-8.3
-10.5	-10.7	-10.0	-10.1	-10.2	-10.5	-11.2	-12.1	-11.8	-11.8	-11.4	-11.0	-10.7	-10.2	-10.2	-10.5	-12.2	-13.4	-14.4	-14.5	-13.5	-13.1	-12.0	-12.3	-12.3	-12.6	-12.5	-12.6	-12.5	-12.3	-12.2	-12.2	-12.0	-11.4	-11.6	-11.2
-11.5	-12.4	-11.8	-11.8	-11.8	-11.9	-11.8	-12.0	-12.0	-12.0	-11.2	-11.7	-11.6	-11.6	-11.5	-11.6	-12.0	-11.8	-13.0	-12.8	-13.0	-11.8	-12.0	-12.4	-12.3	-12.5	-12.4	-12.4	-12.4	-12.5	-12.3	-12.5	-12.8	-12.2	-12.2	-12.7
-11.9	-12.7	-12.3	-12.3	-12.1	-12.0	-12.0	-11.8	-11.9	-11.7	-10.8	-11.6	-11.7	-11.6	-11.8	-12.0	-12.2	-11.3	-12.5	-11.6	-11.8	-11.0	-12.2	-12.3	-12.3	-12.3	-12.4	-12.2	-12.2	-12.2	-12.3	-12.4	-12.2	-12.4	-12.4	-13.0
-11.8	-12.1	-11.8	-11.6	-11.6	-11.3	-11.1	-10.7	-10.7	-11.0	-10.1	-10.1	-11.3	-10.9	-11.6	-11.6	-11.5	-11.1	-11.8	-10.4	-10.8	-10.4	-11.4	-11.9	-12.0	-11.9	-11.4	-11.0	-11.6	-12.2	-11.9	-11.6	-11.7	-11.9	-11.7	-13.0
-9.6	-9.1	-9.5	-9.5	-9.5	-9.1	-8.9	-8.4	-8.3	-8.3	-8.8	-7.5	-9.1	-9.3	-9.8	-9.7	-9.2	-9.7	-9.5	-9.0	-9.6	-9.4	-9.3	-9.5	-9.4	-9.0	-8.4	-7.8	-8.1	-9.3	-9.1	-8.2	-7.8	-8.1	-8.7	-10.0
-5.7	-4.8	-5.9	-5.3	-5.4	-5.2	-5.2	-5.1	-5.0	-4.9	-4.3	-4.4	-4.9	-5.3	-5.4	-5.1	-4.0	-5.4	-4.8	-6.0	-7.0	-7.1	-6.4	-6.0	-5.5	-5.0	-4.3	-3.6	-3.7	-4.7	-5.0	-4.7	-3.8	-4.4	-4.5	-4.9
-2.3	-1.3	-1.9	-1.5	-1.1	-1.1	-1.0	-.9	-1.0	-1.0	-.2	-.4	-.4	-.5	.2	1.0	1.9	.6	1.3	-.3	-.9	-1.5	-1.5	-1.5	-1.1	-.4	.2	.4	.2	-.4	-1.4	-1.9	-1.7	-1.8	-1.7	-.9
2.1	2.4	2.6	2.0	2.2	2.1	2.0	1.9	2.0	1.9	2.1	2.3	3.0	3.7	4.9	5.8	5.8	6.2	6.3	5.2	4.7	4.1	3.8	3.9	4.3	4.9	5.2	5.1	4.8	4.1	3.0	2.3	2.2	1.7	1.8	2.5
7.8	7.4	7.2	6.6	5.8	5.2	4.8	4.6	4.8	4.9	5.1	5.9	7.0	8.4	9.6	9.9	9.6	9.8	9.3	8.8	8.6	8.5	9.1	10.6	10.7	10.2	11.1	11.8	11.1	10.0	9.6	10.0	9.4	8.6	8.2	8.0
13.6	12.7	11.9	11.1	10.9	10.6	9.7	9.6	10.1	10.5	10.6	12.1	12.0	12.6	12.9	13.6	15.6	17.5	18.6	18.4	17.7	19.0	20.7	22.7	20.5	20.5	22.4	22.4	23.2	22.8	22.7	22.1	20.4	19.0	15.9	14.3
16.2	15.9	15.5	15.7	15.6	15.6	16.1	16.6	17.3	18.2	17.4	17.1	17.4	17.7	18.1	19.1	20.3	21.4	22.7	23.9	24.7	25.7	26.0	25.6	26.0	26.8	26.7	26.4	26.1	25.3	24.3	23.0	21.6	19.9	17.6	16.7

Figure 29. ATOVS SD O-B brightness temperature differences (deg C). APRIL 2003
Channel: HIRS15 (700 hPa)
NOAA15, using all observations



3.6	3.6	3.6	3.6	3.6	3.4	3.4	3.5	3.6	3.5	3.3	3.4	3.5	3.5	3.4	3.4	3.5	3.6	3.7	3.9	4.0	4.0	4.1	4.0	4.0	3.9	3.8	3.7	3.6	3.6	3.6	3.6	3.7	3.6	3.5	3.5
3.0	3.2	3.5	3.9	4.0	3.8	3.6	3.4	3.3	3.5	3.6	4.0	4.3	3.9	3.8	3.9	3.9	3.6	3.4	3.6	3.5	3.5	3.3	3.8	3.3	3.2	3.1	3.0	3.1	3.2	3.3	3.2	3.0	3.0	2.9	2.9
2.4	2.8	3.5	4.2	4.6	4.3	4.2	3.9	3.9	4.0	4.2	4.2	3.9	3.7	3.9	3.5	3.4	3.4	3.3	3.4	3.7	3.6	3.3	3.2	3.2	3.3	3.1	2.9	2.8	2.8	2.9	2.9	2.8	2.7	2.5	2.5
2.7	2.8	3.1	3.0	3.3	3.6	4.1	4.3	4.3	4.1	4.3	4.4	3.8	3.4	3.3	3.3	3.1	3.2	3.5	2.8	3.5	3.5	3.3	3.2	3.7	4.2	4.1	3.8	4.0	3.8	3.5	3.4	2.9	2.7	2.7	2.7
3.2	3.5	3.3	3.1	3.0	3.1	3.7	4.2	4.5	4.4	4.2	4.3	4.3	3.9	3.5	3.4	3.3	3.3	3.9	4.0	3.9	3.4	3.3	4.1	4.6	4.7	4.9	4.8	4.5	3.9	3.9	3.6	3.7	3.8	3.8	3.6
2.9	3.3	3.3	3.3	3.4	3.5	3.9	4.3	4.2	4.0	3.8	3.5	3.5	3.6	3.5	3.4	3.6	4.1	4.2	3.6	4.1	3.8	4.2	4.0	4.4	5.6	4.3	4.4	3.9	3.9	3.9	4.0	4.3	4.1	3.8	3.6
3.3	3.4	3.4	3.4	3.4	3.5	3.4	3.7	3.7	3.8	3.6	3.4	3.4	3.4	3.6	3.6	3.9	4.3	4.1	4.3	4.6	3.9	4.0	3.9	4.0	4.1	4.6	4.1	3.7	3.6	3.6	3.3	3.4	3.6	3.3	3.6
3.3	3.2	3.4	3.4	3.3	3.3	3.3	3.4	3.4	3.4	3.4	3.4	3.3	3.3	3.3	3.3	3.6	4.1	3.6	4.2	4.3	3.7	3.5	3.4	3.4	3.5	3.4	3.5	3.5	3.3	3.3	3.2	3.2	3.4	3.2	3.3
3.4	3.1	3.3	3.3	3.2	3.2	3.3	3.3	3.3	3.3	3.3	3.4	3.2	3.2	3.2	3.2	3.3	3.6	3.1	3.8	3.8	3.5	3.4	3.3	3.4	3.3	3.4	3.3	3.3	3.2	3.3	3.2	3.2	3.4	3.4	3.1
3.5	3.2	3.3	3.3	3.3	3.3	3.2	3.2	3.2	3.2	3.2	3.4	3.2	3.2	3.2	3.2	3.3	3.5	3.0	3.7	3.2	3.1	3.3	3.3	3.3	3.3	3.3	3.4	3.3	3.3	3.3	3.2	3.2	3.3	3.3	3.2
3.5	3.3	3.3	3.4	3.4	3.3	3.4	3.3	3.3	3.2	3.4	3.7	3.3	3.2	3.4	3.3	3.4	3.3	3.0	3.5	3.0	3.2	3.3	3.3	3.3	3.3	3.3	3.4	3.4	3.3	3.4	3.3	3.3	3.3	3.4	3.0
3.4	3.7	3.6	3.7	3.6	3.5	3.6	3.6	3.6	3.6	3.6	4.1	3.6	3.2	3.4	3.4	3.7	3.4	3.2	3.6	3.6	3.5	3.5	3.5	3.4	3.6	3.5	3.5	3.6	3.7	3.9	3.7	3.7	8.9	3.7	3.6
3.4	4.2	4.2	3.9	3.7	3.6	3.8	3.7	3.8	3.9	4.0	3.8	3.8	3.5	3.7	4.0	4.3	3.8	3.7	3.7	3.9	3.9	3.7	3.5	3.5	3.7	3.7	3.6	3.6	3.9	3.8	3.5	3.4	3.7	3.7	8.9
3.6	4.0	3.9	3.5	3.5	3.5	3.7	3.5	3.5	3.6	3.8	3.7	3.6	3.5	3.5	3.7	3.6	3.6	3.7	3.7	4.1	4.1	4.0	4.1	4.1	4.0	3.9	3.8	3.7	3.6	3.4	3.5	3.5	3.4	3.4	3.5
3.7	3.7	3.5	3.6	3.5	3.4	3.4	3.3	3.3	3.1	3.4	3.6	3.4	3.4	3.3	3.2	2.9	3.3	3.1	3.1	3.3	3.6	3.6	3.6	3.5	3.5	3.3	3.1	3.3	3.5	3.5	3.5	3.6	3.5	3.6	3.7
3.9	3.9	3.5	3.4	3.4	3.4	3.4	3.5	3.5	3.5	3.7	4.4	4.4	4.2	3.6	3.2	3.1	2.9	3.1	3.0	3.0	3.3	4.0	4.9	4.5	3.8	4.5	5.0	5.0	4.7	5.0	5.5	4.7	4.3	4.2	4.1
2.3	2.5	2.8	3.2	3.7	4.3	4.2	4.5	4.7	4.8	4.7	4.4	3.9	3.3	2.8	2.7	3.0	3.4	4.0	4.2	4.4	4.0	3.2	2.1	3.3	3.5	2.9	2.5	2.5	3.0	2.8	2.1	2.2	2.3	2.6	2.3
3.8	3.8	4.0	4.1	4.4	4.4	4.6	4.7	4.5	3.7	3.5	3.4	3.6	3.4	3.2	2.7	2.2	1.7	1.6	1.3	1.4	1.5	1.4	1.6	1.8	2.0	1.9	2.0	1.9	1.6	1.5	1.8	2.4	3.0	3.8	3.9

Figure 30. ATOVS MEAN O-B brightness temperature differences (deg C). APRIL 2003
Channel: HIRS11 (500 - 700 hPa)
NOAA15, using all observations



7.3	7.3	7.4	7.5	7.5	7.6	7.5	7.4	7.4	8.1	8.4	8.0	8.6	8.7	8.8	7.8	7.0	6.5	6.1	6.0	6.1	6.3	6.6	6.9	7.6	8.0	8.1	8.2	8.3	8.3	8.2	8.1	8.0	7.8	7.7	7.5
5.2	5.0	5.0	5.1	5.2	5.4	5.6	5.5	5.5	6.5	6.4	6.8	7.7	9.6	9.6	6.2	3.7	2.7	2.1	2.6	3.2	3.5	4.2	4.8	5.5	5.9	6.2	6.7	7.1	7.0	7.0	6.7	6.3	6.2	5.9	5.6
3.3	2.3	2.3	2.0	1.6	2.1	3.1	4.0	4.7	5.5	5.8	5.0	4.5	5.8	3.9	2.9	1.8	.6	.8	.9	1.5	2.1	2.2	2.7	3.4	4.3	5.2	5.6	5.5	5.5	5.6	6.2	6.3	5.7	5.6	4.4
1.6	1.7	1.0	.3	.6	1.9	1.7	1.8	2.1	3.2	3.9	4.1	2.8	1.6	.6	.6	-.2	-.5	-.6	-.1	1.1	2.0	1.7	1.2	.8	1.9	3.3	4.0	3.3	2.9	2.8	3.3	2.8	2.9	2.7	2.1
-1.0	-.3	-.2	-.2	.9	1.4	.9	-1.1	-1.3	-.9	-.2	-.3	-.5	-1.2	-.9	-.8	-1.7	-1.8	-2.0	-1.6	.2	-.8	-.7	-.8	-1.7	-.8	.0	-.3	-.8	-.2	-.2	-.1	-.8	.3	-.6	.0
-4.8	-3.1	-3.4	-3.5	-2.4	-2.4	-4.9	-6.2	-6.2	-5.1	-4.7	-4.2	-3.2	-3.1	-3.0	-3.2	-4.1	-5.0	-4.5	-5.2	-4.1	-8.9	-3.5	-3.2	-4.9	-3.0	-2.4	-3.0	-3.5	-3.3	-3.7	-3.4	-2.8	-2.7	-3.2	-2.9
-8.7	-6.6	-7.2	-6.9	-7.8	-8.1	-7.6	-5.8	-5.1	-5.9	-6.2	-5.8	-7.1	-9.0	-9.0	-8.9	-8.7	-9.7	-8.9	-8.1	-8.8	-10.7	-7.6	-9.0	-12.1	-10.4	-7.7	-5.2	-5.8	-5.4	-5.6	-6.7	-7.5	-7.8	-8.6	-9.6
-8.3	-7.0	-4.9	-4.5	-5.1	-5.0	-6.0	-9.2	-9.8	-10.4	-9.4	-7.7	-8.8	-8.9	-8.9	-8.0	-8.7	-8.5	-10.6	-11.4	-10.5	-9.9	-9.8	-13.5	-14.1	-9.9	-9.8	-10.2	-8.3	-10.4	-10.7	-9.6	-8.7	-7.9	-9.1	-9.0
-4.7	-5.2	-5.0	-5.5	-5.7	-6.0	-6.2	-7.5	-8.6	-7.2	-3.8	-4.5	-5.7	-5.6	-5.3	-5.0	-5.3	-5.6	-6.0	-5.7	-4.5	-4.6	-7.9	-9.7	-7.5	-5.7	-6.6	-5.8	-6.9	-7.7	-7.2	-6.4	-5.3	-4.5	-4.1	-5.1
-6.6	-8.2	-8.9	-9.9	-10.6	-10.7	-11.3	-11.3	-11.1	-8.7	-3.2	-3.5	-6.1	-7.4	-6.8	-7.2	-9.0	-8.4	-6.2	-4.5	-5.3	-5.9	-5.5	-5.4	-4.7	-4.2	-3.7	-3.8	-4.8	-5.9	-6.6	-6.7	-6.0	-5.3	-5.1	-5.9
-6.4	-7.4	-7.1	-8.3	-10.0	-12.4	-13.1	-13.9	-14.4	-13.5	-9.0	-6.4	-7.3	-9.6	-9.6	-12.2	-14.5	-15.5	-14.3	-8.8	-9.7	-11.6	-9.4	-5.1	-5.6	-7.2	-6.8	-6.6	-7.3	-9.0	-10.8	-10.5	-10.4	-10.0	-8.7	-8.2
-6.2	-6.2	-5.3	-4.7	-5.0	-5.2	-6.7	-8.4	-10.0	-11.6	-13.1	-10.1	-9.4	-8.3	-8.5	-8.4	-8.0	-10.4	-12.1	-9.0	-8.3	-11.4	-9.8	-6.3	-4.7	-7.6	-8.5	-8.6	-8.2	-7.5	-8.1	-8.3	-9.1	-8.8	-7.9	-7.3
-5.2	-5.0	-5.3	-4.6	-3.3	-2.8	-3.2	-2.9	-4.1	-4.8	-5.4	-5.3	-5.1	-4.8	-4.9	-4.6	-3.8	-4.7	-4.4	-5.4	-5.3	-6.3	-6.8	-5.1	-4.8	-5.1	-4.1	-3.4	-4.3	-4.8	-4.4	-5.6	-5.4	-4.9	-5.9	-5.8
-2.5	-1.9	-1.9	-1.6	-1.7	-2.2	-2.0	-1.7	-1.8	-1.3	-1.8	-2.0	-1.5	-1.2	-1.3	-.4	.2	-.8	-.3	-1.2	-1.2	-1.3	-1.9	-2.0	-1.8	-1.0	-.3	.4	.2	-.9	-1.7	-2.3	-2.8	-2.5	-2.4	-1.9
.6	.4	.9	1.1	.7	.4	.1	.2	.4	.5	.8	.7	1.0	1.1	1.5	2.5	2.5	2.6	2.6	1.8	1.9	1.6	1.4	1.6	1.9	2.0	2.2	2.1	2.2	1.9	1.4	.8	.9	.7	.4	.8
3.7	3.7	3.3	2.9	2.7	2.4	2.0	1.8	2.1	2.0	2.0	2.2	2.5	3.6	4.4	4.7	4.5	4.8	4.6	4.2	3.9	4.1	5.2	6.9	6.1	5.1	6.8	8.0	7.5	6.2	6.4	7.4	6.0	4.7	4.0	4.0
8.3	7.4	6.6	6.3	6.7	6.7	5.6	5.6	6.4	6.5	6.2	7.5	6.8	7.3	7.4	8.4	11.5	14.8	17.0	16.3	14.8	17.4	21.5	25.8	19.5	19.5	24.1	25.2	27.7	26.8	26.9	26.9	23.7	20.2	12.3	8.9
11.5	10.8	10.1	10.6	10.9	11.4	12.5	13.9	15.1	15.4	13.6	13.0	13.8	14.7	15.9	18.0	20.4	23.1	25.8	27.7	28.7	30.5	30.6	30.9	31.9	31.3	31.1	30.9	30.6	30.7	29.0	26.1	22.6	18.6	13.9	12.4

Figure 31. ATOVS SD O-B brightness temperature differences (deg C). APRIL 2003
Channel: HIRS11 (500 - 700 hPa)
NOAA15, using all observations

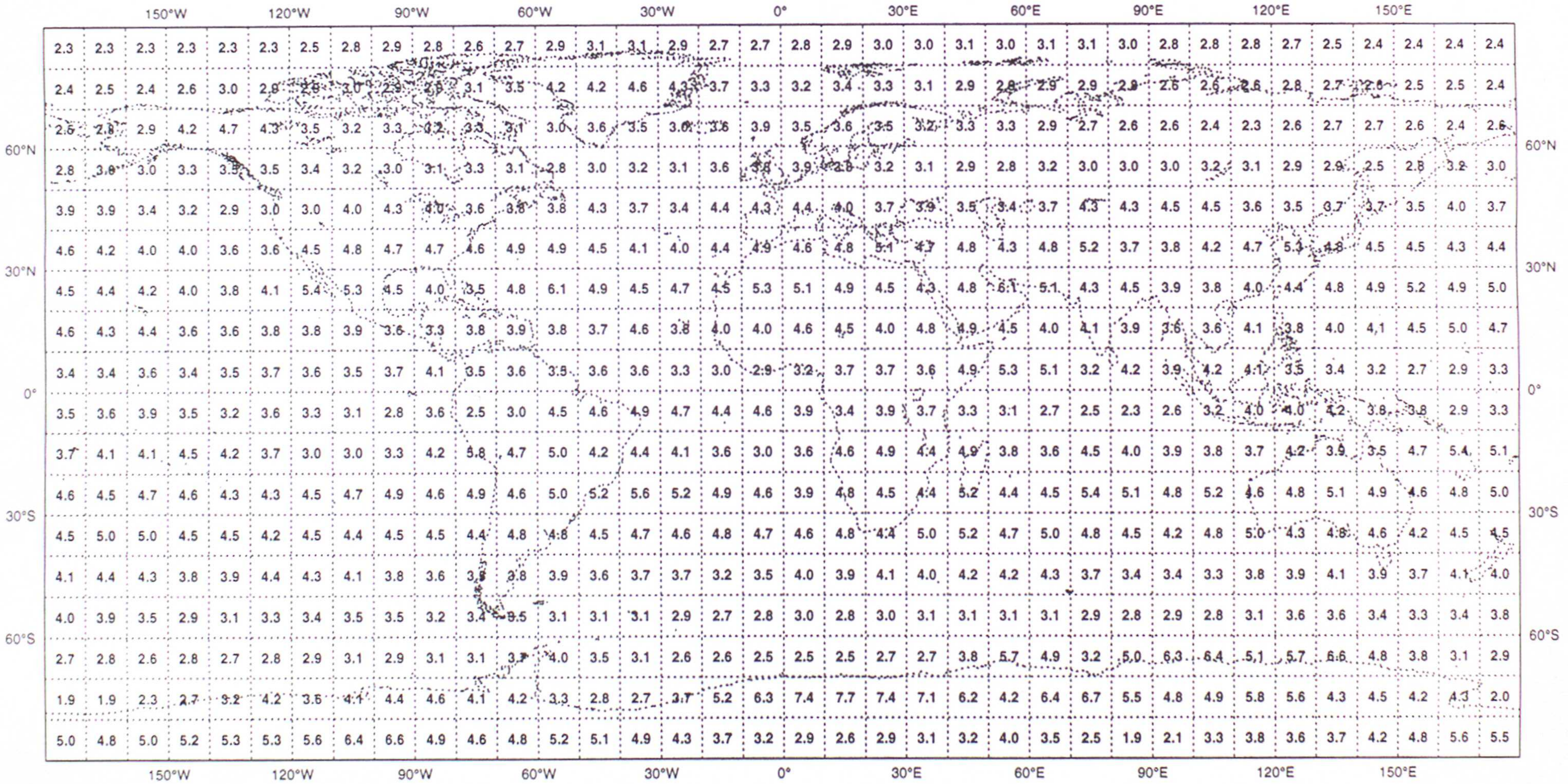
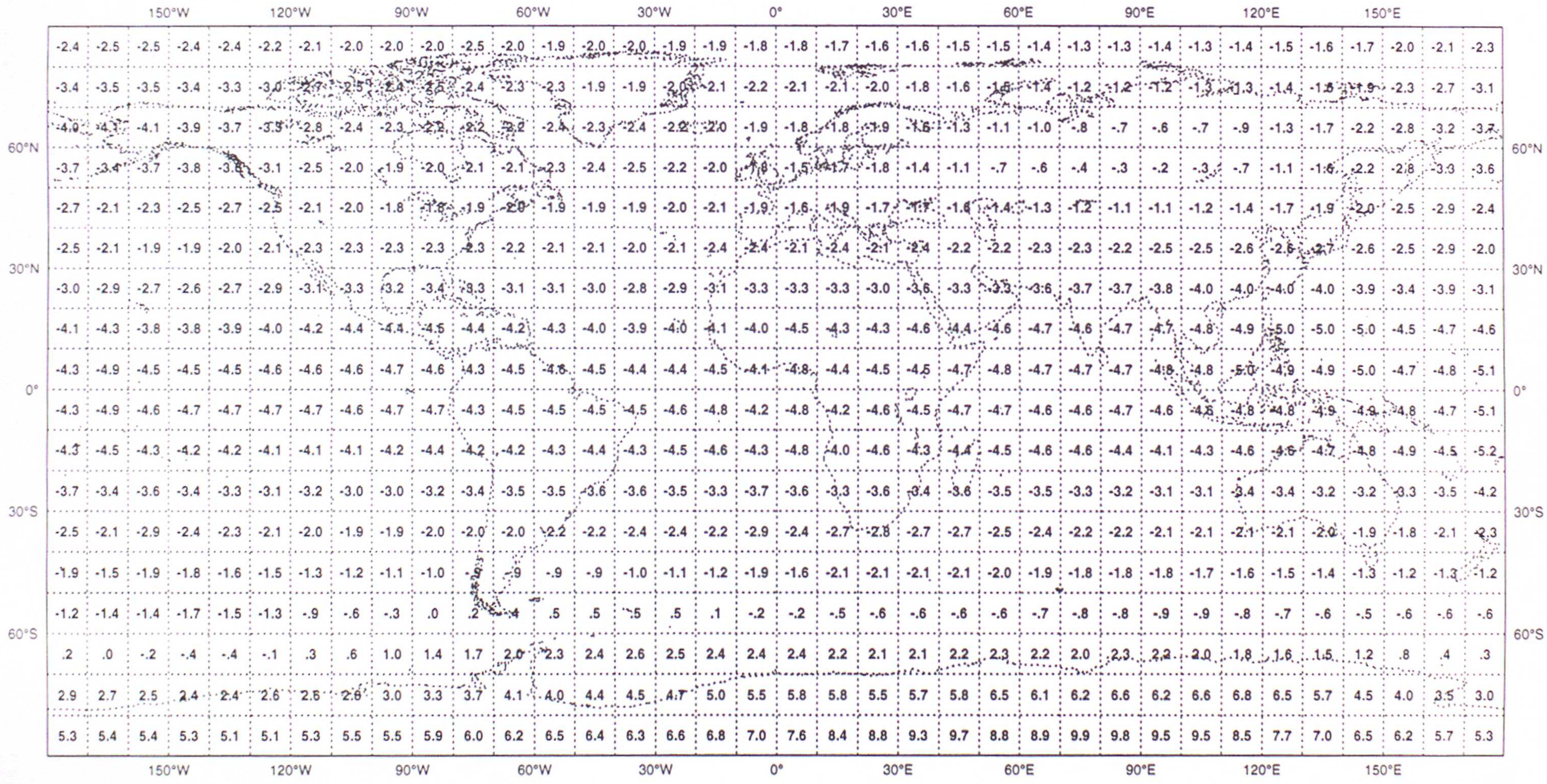
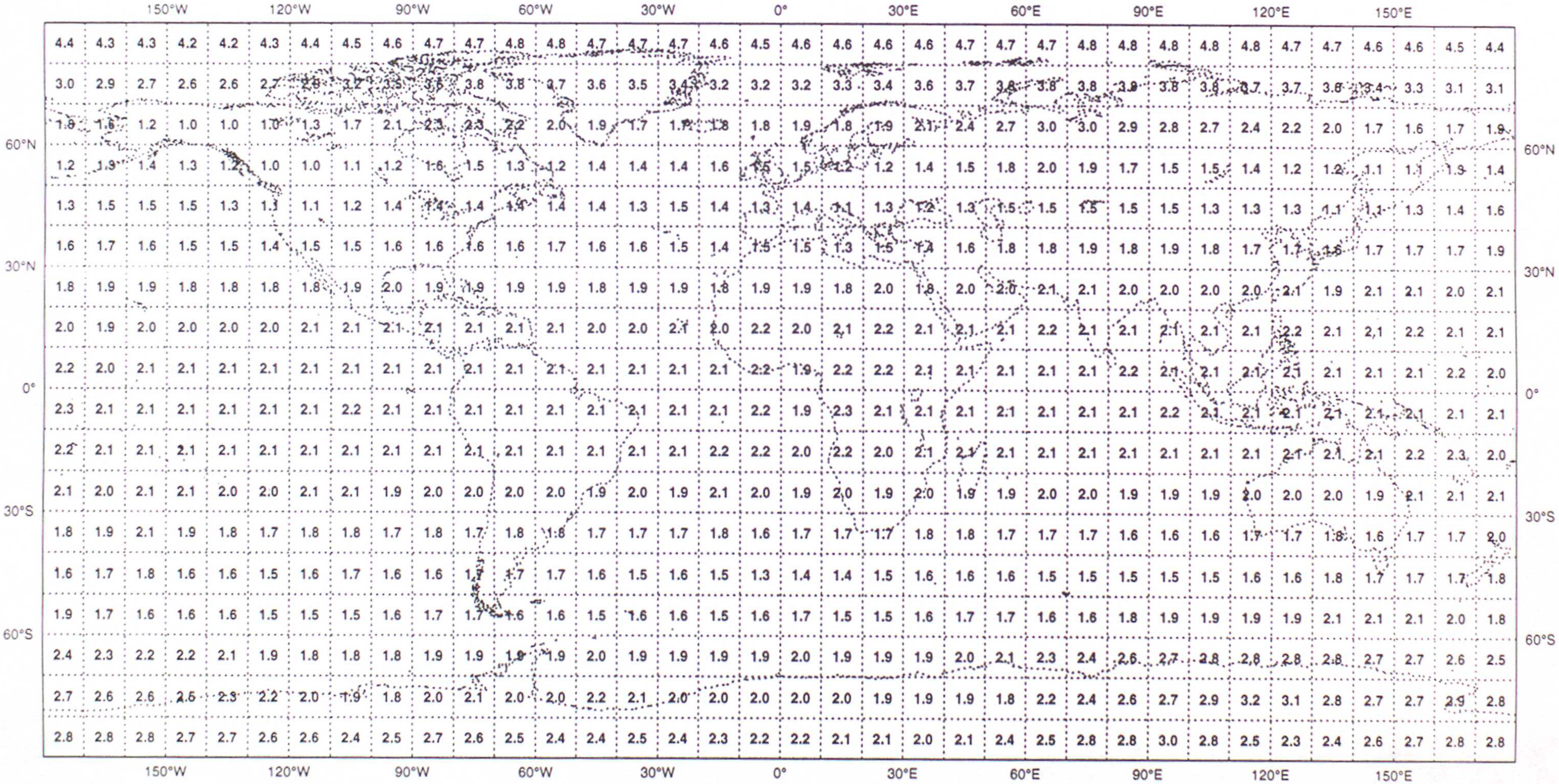

150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S
2.3 2.3 2.3 2.3 2.3 2.3 2.5 2.8 2.9 2.8 2.6 2.7 2.9 3.1 3.1 2.9 2.7 2.7 2.8 2.9 3.0 3.0 3.1 3.0 3.1 3.1 3.0 2.8 2.8 2.8 2.7 2.5 2.4 2.4 2.4 2.4
2.4 2.5 2.4 2.6 3.0 2.8 2.8 3.0 2.9 2.9 3.1 3.5 4.2 4.2 4.6 4.3 3.7 3.3 3.2 3.4 3.3 3.1 2.9 2.8 2.9 2.9 2.9 2.6 2.6 2.6 2.8 2.7 2.6 2.5 2.5 2.4
2.6 2.8 2.9 4.2 4.7 4.3 3.5 3.2 3.3 3.2 3.3 3.1 3.0 3.6 3.5 3.0 3.6 3.9 3.5 3.6 3.5 3.2 3.3 3.3 2.9 2.7 2.6 2.6 2.4 2.3 2.6 2.7 2.7 2.6 2.4 2.6
2.8 3.8 3.0 3.3 3.5 3.5 3.4 3.2 3.0 3.1 3.3 3.1 2.8 3.0 3.2 3.1 3.6 3.8 3.9 2.8 3.2 3.1 2.9 2.8 3.2 3.0 3.0 3.0 3.2 3.1 2.9 2.9 2.5 2.8 3.2 3.0
3.9 3.9 3.4 3.2 2.9 3.0 3.0 4.0 4.3 4.0 3.6 3.8 3.8 4.3 3.7 3.4 4.4 4.3 4.4 4.0 3.7 3.9 3.5 3.4 3.7 4.3 4.3 4.5 4.5 3.6 3.5 3.7 3.7 3.5 4.0 3.7
4.6 4.2 4.0 4.0 3.6 3.6 4.5 4.8 4.7 4.7 4.6 4.9 4.9 4.5 4.1 4.0 4.4 4.9 4.6 4.8 5.1 4.7 4.8 4.3 4.8 5.2 3.7 3.8 4.2 4.7 5.3 4.8 4.5 4.5 4.3 4.4
4.5 4.4 4.2 4.0 3.8 4.1 5.4 5.3 4.5 4.0 3.5 4.8 6.1 4.9 4.5 4.7 4.5 5.3 5.1 4.9 4.5 4.3 4.8 6.1 5.1 4.3 4.5 3.9 3.8 4.0 4.4 4.8 4.9 5.2 4.9 5.0
4.6 4.3 4.4 3.6 3.6 3.8 3.8 3.9 3.6 3.3 3.8 3.9 3.8 3.7 4.6 3.8 4.0 4.0 4.6 4.5 4.0 4.8 4.9 4.5 4.0 4.1 3.9 3.6 3.6 4.1 3.8 4.0 4.1 4.5 5.0 4.7
3.4 3.4 3.6 3.4 3.5 3.7 3.6 3.5 3.7 4.1 3.5 3.6 3.5 3.6 3.6 3.3 3.0 2.9 3.2 3.7 3.7 3.6 4.9 5.3 5.1 3.2 4.2 3.9 4.2 4.1 3.5 3.4 3.2 2.7 2.9 3.3
3.5 3.6 3.9 3.5 3.2 3.6 3.3 3.1 2.8 3.6 2.5 3.0 4.5 4.6 4.9 4.7 4.4 4.6 3.9 3.4 3.9 3.7 3.3 3.1 2.7 2.5 2.3 2.6 3.2 4.0 4.0 4.2 3.8 3.8 2.9 3.3
3.7 4.1 4.1 4.5 4.2 3.7 3.0 3.0 3.3 4.2 5.8 4.7 5.0 4.2 4.4 4.1 3.6 3.0 3.6 4.6 4.9 4.4 4.9 3.8 3.6 4.5 4.0 3.9 3.8 3.7 4.2 3.9 3.5 4.7 5.4 5.1
4.6 4.5 4.7 4.6 4.3 4.3 4.5 4.7 4.9 4.6 4.9 4.6 5.0 5.2 5.6 5.2 4.9 4.6 3.9 4.8 4.5 4.4 5.2 4.4 4.5 5.4 5.1 4.8 5.2 4.6 4.8 5.1 4.9 4.6 4.8 5.0
4.5 5.0 5.0 4.5 4.5 4.2 4.5 4.4 4.5 4.5 4.4 4.8 4.8 4.5 4.7 4.6 4.8 4.7 4.6 4.8 4.4 5.0 5.2 4.7 5.0 4.8 4.5 4.2 4.8 5.0 4.3 4.8 4.6 4.2 4.5 4.5
4.1 4.4 4.3 3.8 3.9 4.4 4.3 4.1 3.8 3.6 3.8 3.8 3.9 3.6 3.7 3.7 3.2 3.5 4.0 3.9 4.1 4.0 4.2 4.2 4.3 3.7 3.4 3.4 3.3 3.8 3.9 4.1 3.9 3.7 4.1 4.0
4.0 3.9 3.5 2.9 3.1 3.3 3.4 3.5 3.5 3.2 3.4 3.5 3.1 3.1 3.1 2.9 2.7 2.8 3.0 2.8 3.0 3.1 3.1 3.1 3.1 2.9 2.8 2.9 2.8 3.1 3.6 3.6 3.4 3.3 3.4 3.8
2.7 2.8 2.6 2.8 2.7 2.8 2.9 3.1 2.9 3.1 3.1 3.7 4.0 3.5 3.1 2.6 2.6 2.5 2.5 2.5 2.7 2.7 3.8 5.7 4.9 3.2 5.0 6.3 6.4 5.1 5.7 6.6 4.8 3.8 3.1 2.9
1.9 1.9 2.3 2.7 3.2 4.2 3.6 4.1 4.4 4.6 4.1 4.2 3.3 2.8 2.7 3.7 5.2 6.3 7.4 7.7 7.4 7.1 6.2 4.2 6.4 6.7 5.5 4.8 4.9 5.8 5.6 4.3 4.5 4.2 4.3 2.0
5.0 4.8 5.0 5.2 5.3 5.3 5.6 6.4 6.6 4.9 4.6 4.8 5.2 5.1 4.9 4.3 3.7 3.2 2.9 2.6 2.9 3.1 3.2 4.0 3.5 2.5 1.9 2.1 3.3 3.8 3.6 3.7 4.2 4.8 5.6 5.5

Figure 32. ATOVS MEAN O-B brightness temperature differences (deg C). APRIL 2003
Channel: HIRS4 (400 hPa)
NOAA15, using all observations



-2.4	-2.5	-2.5	-2.4	-2.4	-2.2	-2.1	-2.0	-2.0	-2.0	-2.5	-2.0	-1.9	-2.0	-2.0	-1.9	-1.9	-1.8	-1.8	-1.7	-1.6	-1.6	-1.5	-1.5	-1.4	-1.3	-1.3	-1.4	-1.3	-1.4	-1.5	-1.6	-1.7	-2.0	-2.1	-2.3
-3.4	-3.5	-3.5	-3.4	-3.3	-3.0	-2.7	-2.5	-2.4	-2.5	-2.4	-2.3	-2.3	-1.9	-1.9	-2.0	-2.1	-2.2	-2.1	-2.1	-2.0	-1.8	-1.6	-1.6	-1.4	-1.2	-1.2	-1.2	-1.3	-1.3	-1.4	-1.5	-1.9	-2.3	-2.7	-3.1
-4.0	-4.1	-4.1	-3.9	-3.7	-3.5	-2.8	-2.4	-2.3	-2.2	-2.2	-2.2	-2.4	-2.3	-2.4	-2.2	-2.0	-1.9	-1.8	-1.8	-1.9	-1.6	-1.3	-1.1	-1.0	-.8	-.7	-.6	-.7	-.9	-1.3	-1.7	-2.2	-2.8	-3.2	-3.7
-3.7	-3.4	-3.7	-3.8	-3.8	-3.1	-2.5	-2.0	-1.9	-2.0	-2.1	-2.1	-2.3	-2.4	-2.5	-2.2	-2.0	-1.8	-1.5	-1.7	-1.8	-1.4	-1.1	-.7	-.6	-.4	-.3	-.2	-.3	-.7	-1.1	-1.6	-2.2	-2.8	-3.3	-3.6
-2.7	-2.1	-2.3	-2.5	-2.7	-2.5	-2.1	-2.0	-1.8	-1.8	-1.9	-2.0	-1.9	-1.9	-1.9	-2.0	-2.1	-1.9	-1.6	-1.9	-1.7	-1.7	-1.6	-1.4	-1.3	-1.2	-1.1	-1.1	-1.2	-1.4	-1.7	-1.9	-2.0	-2.5	-2.9	-2.4
-2.5	-2.1	-1.9	-1.9	-2.0	-2.1	-2.3	-2.3	-2.3	-2.3	-2.3	-2.2	-2.1	-2.1	-2.0	-2.1	-2.4	-2.4	-2.1	-2.4	-2.1	-2.4	-2.2	-2.2	-2.3	-2.3	-2.2	-2.5	-2.5	-2.6	-2.6	-2.7	-2.6	-2.5	-2.9	-2.0
-3.0	-2.9	-2.7	-2.6	-2.7	-2.9	-3.1	-3.3	-3.2	-3.4	-3.3	-3.1	-3.1	-3.0	-2.8	-2.9	-3.1	-3.3	-3.3	-3.3	-3.0	-3.6	-3.3	-3.3	-3.6	-3.7	-3.7	-3.8	-4.0	-4.0	-4.0	-4.0	-3.9	-3.4	-3.9	-3.1
-4.1	-4.3	-3.8	-3.8	-3.9	-4.0	-4.2	-4.4	-4.4	-4.5	-4.4	-4.2	-4.3	-4.0	-3.9	-4.0	-4.1	-4.0	-4.5	-4.3	-4.3	-4.6	-4.4	-4.6	-4.7	-4.6	-4.7	-4.7	-4.8	-4.9	-5.0	-5.0	-5.0	-4.5	-4.7	-4.6
-4.3	-4.9	-4.5	-4.5	-4.5	-4.6	-4.6	-4.6	-4.7	-4.6	-4.3	-4.5	-4.6	-4.5	-4.4	-4.4	-4.5	-4.1	-4.8	-4.4	-4.5	-4.5	-4.7	-4.8	-4.7	-4.7	-4.7	-4.8	-4.8	-5.0	-4.9	-4.9	-5.0	-4.7	-4.8	-5.1
-4.3	-4.9	-4.6	-4.7	-4.7	-4.7	-4.7	-4.6	-4.7	-4.7	-4.3	-4.5	-4.5	-4.5	-4.5	-4.6	-4.8	-4.2	-4.8	-4.2	-4.6	-4.5	-4.7	-4.7	-4.6	-4.6	-4.7	-4.6	-4.6	-4.8	-4.8	-4.9	-4.9	-4.8	-4.7	-5.1
-4.3	-4.5	-4.3	-4.2	-4.2	-4.1	-4.1	-4.1	-4.2	-4.4	-4.2	-4.2	-4.3	-4.4	-4.3	-4.5	-4.6	-4.3	-4.8	-4.0	-4.6	-4.3	-4.4	-4.5	-4.6	-4.6	-4.4	-4.1	-4.3	-4.6	-4.6	-4.7	-4.8	-4.9	-4.5	-5.2
-3.7	-3.4	-3.6	-3.4	-3.3	-3.1	-3.2	-3.0	-3.0	-3.2	-3.4	-3.5	-3.5	-3.6	-3.6	-3.5	-3.3	-3.7	-3.6	-3.3	-3.6	-3.4	-3.6	-3.5	-3.5	-3.3	-3.2	-3.1	-3.1	-3.4	-3.4	-3.2	-3.2	-3.3	-3.5	-4.2
-2.5	-2.1	-2.9	-2.4	-2.3	-2.1	-2.0	-1.9	-1.9	-2.0	-2.0	-2.0	-2.2	-2.2	-2.4	-2.4	-2.2	-2.9	-2.4	-2.7	-2.8	-2.7	-2.7	-2.5	-2.4	-2.2	-2.2	-2.1	-2.1	-2.1	-2.1	-2.0	-1.9	-1.8	-2.1	-2.3
-1.9	-1.5	-1.9	-1.8	-1.6	-1.5	-1.3	-1.2	-1.1	-1.0	-.9	-.9	-.9	-.9	-1.0	-1.1	-1.2	-1.9	-1.6	-2.1	-2.1	-2.1	-2.1	-2.0	-1.9	-1.8	-1.8	-1.8	-1.7	-1.6	-1.5	-1.4	-1.3	-1.2	-1.3	-1.2
-1.2	-1.4	-1.4	-1.7	-1.5	-1.3	-.9	-.6	-.3	.0	.2	.4	.5	.5	.5	.5	.1	-.2	-.2	-.5	-.6	-.6	-.6	-.6	-.7	-.8	-.8	-.9	-.9	-.8	-.7	-.6	-.5	-.6	-.6	-.6
.2	.0	-.2	-.4	-.4	-.1	.3	.6	1.0	1.4	1.7	2.0	2.3	2.4	2.6	2.5	2.4	2.4	2.4	2.2	2.1	2.1	2.2	2.3	2.2	2.0	2.3	2.2	2.0	1.8	1.6	1.5	1.2	.8	.4	.3
2.9	2.7	2.5	2.4	2.4	2.6	2.6	2.8	3.0	3.3	3.7	4.1	4.0	4.4	4.5	4.7	5.0	5.5	5.8	5.8	5.5	5.7	5.8	6.5	6.1	6.2	6.6	6.2	6.6	6.8	6.5	5.7	4.5	4.0	3.5	3.0
5.3	5.4	5.4	5.3	5.1	5.1	5.3	5.5	5.5	5.9	6.0	6.2	6.5	6.4	6.3	6.6	6.8	7.0	7.6	8.4	8.8	9.3	9.7	8.8	8.9	9.9	9.8	9.5	9.5	8.5	7.7	7.0	6.5	6.2	5.7	5.3

Figure 33. ATOVS SD O-B brightness temperature differences (deg C). APRIL 2003
Channel: HIRS4 (400 hPa)
NOAA15, using all observations



4.4	4.3	4.3	4.2	4.2	4.3	4.4	4.5	4.6	4.7	4.7	4.8	4.8	4.7	4.7	4.7	4.6	4.5	4.6	4.6	4.6	4.6	4.7	4.7	4.7	4.8	4.8	4.8	4.8	4.8	4.7	4.7	4.6	4.6	4.5	4.4
3.0	2.9	2.7	2.6	2.6	2.7	2.8	3.2	3.5	3.6	3.8	3.8	3.7	3.6	3.5	3.4	3.2	3.2	3.2	3.3	3.4	3.6	3.7	3.8	3.8	3.8	3.9	3.8	3.8	3.7	3.7	3.6	3.4	3.3	3.1	3.1
1.8	1.6	1.2	1.0	1.0	1.0	1.3	1.7	2.1	2.3	2.3	2.2	2.0	1.9	1.7	1.7	1.8	1.8	1.9	1.8	1.9	2.1	2.4	2.7	3.0	3.0	2.9	2.8	2.7	2.4	2.2	2.0	1.7	1.6	1.7	1.9
1.2	1.3	1.4	1.3	1.2	1.0	1.0	1.1	1.2	1.6	1.5	1.3	1.2	1.4	1.4	1.4	1.6	1.5	1.5	1.2	1.2	1.4	1.5	1.8	2.0	1.9	1.7	1.5	1.5	1.4	1.2	1.2	1.1	1.1	1.3	1.4
1.3	1.5	1.5	1.5	1.3	1.1	1.1	1.2	1.4	1.4	1.4	1.4	1.4	1.4	1.3	1.5	1.4	1.3	1.4	1.1	1.3	1.2	1.3	1.5	1.5	1.5	1.5	1.5	1.3	1.3	1.3	1.1	1.1	1.3	1.4	1.6
1.6	1.7	1.6	1.5	1.5	1.4	1.5	1.5	1.6	1.6	1.6	1.6	1.7	1.6	1.6	1.5	1.4	1.5	1.5	1.3	1.5	1.4	1.6	1.8	1.8	1.9	1.8	1.9	1.8	1.7	1.7	1.6	1.7	1.7	1.7	1.9
1.8	1.9	1.9	1.8	1.8	1.8	1.8	1.9	2.0	1.9	1.9	1.9	1.9	1.8	1.9	1.9	1.8	1.9	1.9	1.8	2.0	1.8	2.0	2.0	2.1	2.1	2.0	2.0	2.0	2.0	2.1	1.9	2.1	2.1	2.0	2.1
2.0	1.9	2.0	2.0	2.0	2.0	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.0	2.0	2.1	2.0	2.2	2.0	2.1	2.2	2.1	2.1	2.1	2.2	2.1	2.1	2.1	2.1	2.1	2.2	2.1	2.1	2.2	2.1	2.1
2.2	2.0	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	1.9	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.0
2.3	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	1.9	2.3	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1
2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.0	2.2	2.0	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.3	2.0
2.1	2.0	2.1	2.1	2.0	2.0	2.1	2.1	1.9	2.0	2.0	2.0	2.0	1.9	2.0	1.9	2.1	2.0	1.9	2.0	1.9	2.0	1.9	1.9	2.0	2.0	1.9	1.9	1.9	2.0	2.0	2.0	1.9	2.1	2.1	2.1
1.8	1.9	2.1	1.9	1.8	1.7	1.8	1.8	1.7	1.8	1.7	1.8	1.8	1.7	1.7	1.7	1.8	1.6	1.7	1.7	1.7	1.8	1.8	1.7	1.7	1.7	1.6	1.6	1.6	1.7	1.7	1.8	1.6	1.7	1.7	2.0
1.6	1.7	1.8	1.6	1.6	1.5	1.6	1.7	1.6	1.6	1.7	1.7	1.7	1.6	1.5	1.6	1.5	1.3	1.4	1.4	1.5	1.6	1.6	1.6	1.5	1.5	1.5	1.5	1.5	1.6	1.6	1.8	1.7	1.7	1.7	1.8
1.9	1.7	1.6	1.6	1.6	1.5	1.5	1.5	1.6	1.7	1.7	1.6	1.6	1.5	1.6	1.6	1.5	1.6	1.7	1.5	1.5	1.6	1.7	1.7	1.6	1.6	1.8	1.9	1.9	1.9	1.9	2.1	2.1	2.1	2.0	1.8
2.4	2.3	2.2	2.2	2.1	1.9	1.8	1.8	1.8	1.9	1.9	1.9	1.9	2.0	1.9	1.9	1.9	1.9	2.0	1.9	1.9	1.9	2.0	2.1	2.3	2.4	2.6	2.7	2.8	2.8	2.8	2.8	2.7	2.7	2.6	2.5
2.7	2.6	2.6	2.5	2.3	2.2	2.0	1.9	1.8	2.0	2.1	2.0	2.0	2.2	2.1	2.0	2.0	2.0	2.0	2.0	1.9	1.9	1.9	1.8	2.2	2.4	2.6	2.7	2.9	3.2	3.1	2.8	2.7	2.7	2.9	2.8
2.8	2.8	2.8	2.7	2.7	2.6	2.6	2.4	2.5	2.7	2.6	2.5	2.4	2.4	2.5	2.4	2.3	2.2	2.2	2.1	2.1	2.0	2.1	2.4	2.5	2.8	2.8	3.0	2.8	2.5	2.3	2.4	2.6	2.7	2.8	2.8

Figure 34. ATOVS MEAN O-B brightness temperature differences (deg C). APRIL 2003
Channel: AMSUA-5 (700 hPa)
NOAA15, using all observations

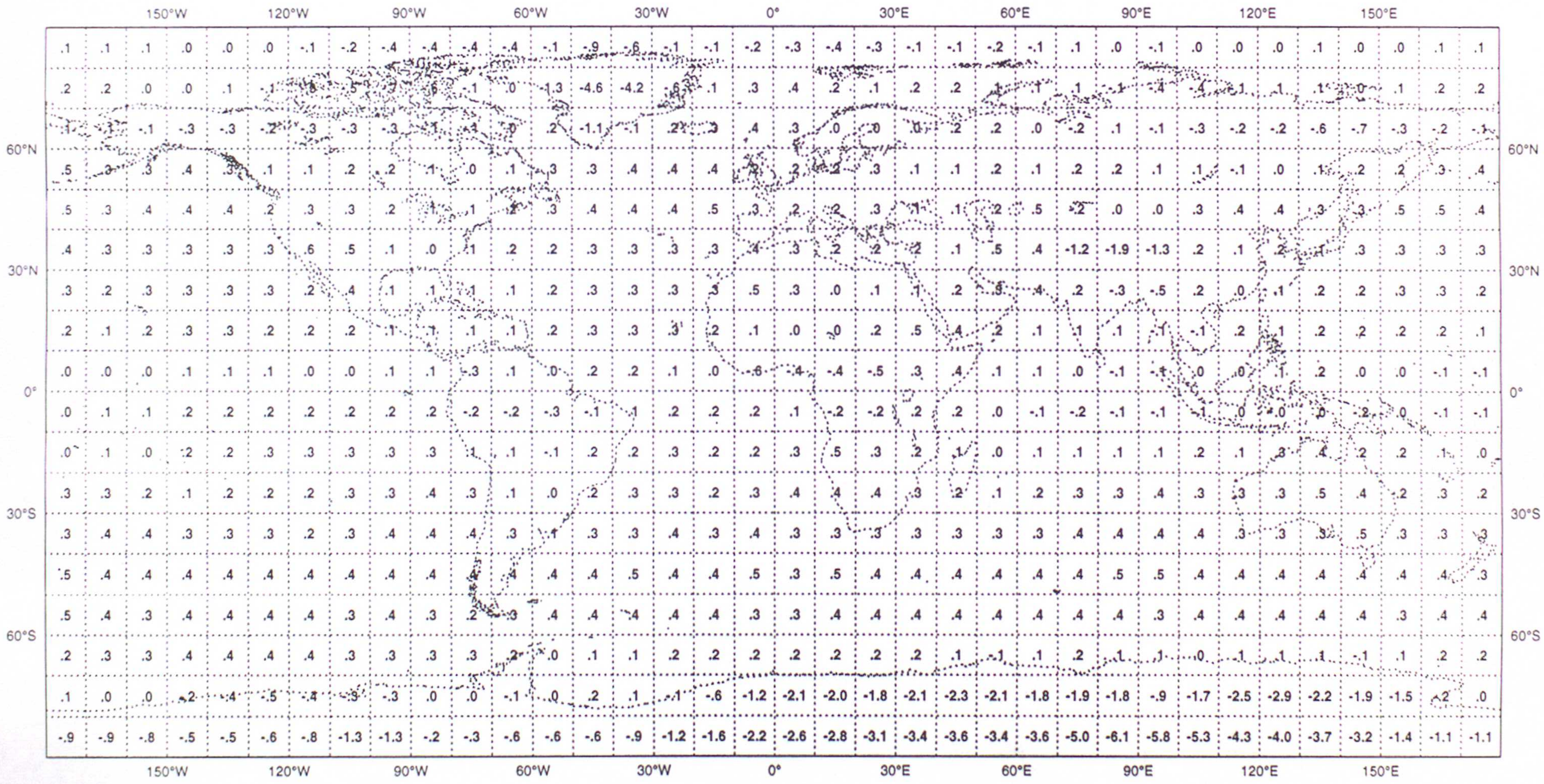

150°W 120°W 90°W 60°W 30°W 0° 30°E 60°E 90°E 120°E 150°E
60°N
30°N
0°
30°S
60°S
.1 .1 .1 .0 .0 .0 -.1 -.2 -.4 -.4 -.4 -.4 -.1 -.9 -.6 -.1 -.1 -.2 -.3 -.4 -.3 -.1 -.1 -.2 -.1 .1 .0 -.1 .0 .0 .0 .1 .0 .0 .1 .1
.2 .2 .0 .0 .1 -.1 .8 .5 .7 .6 -.1 .0 -1.3 -4.6 -4.2 -.6 .1 .3 .4 .2 .1 .2 .2 .1 .1 .1 -.1 -.4 -.4 -.1 .1 .1 .0 .1 .2 .2
.1 -.1 -.1 -.3 -.3 -.2 -.3 -.3 -.3 -.1 -.1 .0 .2 -1.1 -.1 .2 .3 .4 .3 .0 .0 .0 .2 .2 .0 -.2 .1 -.1 -.3 -.2 -.2 -.6 -.7 -.3 -.2 -.1
.5 .3 .3 .4 .3 .1 .1 .2 .2 .1 .0 .1 .3 .3 .4 .4 .4 .2 .2 .2 .3 .1 .1 .2 .1 .2 .2 .1 .1 -.1 .0 .1 .2 .2 .3 .4
.5 .3 .4 .4 .4 .2 .3 .3 .2 .1 .1 .2 .3 .4 .4 .4 .5 .3 .2 .2 .3 .1 .1 .2 .5 .2 .0 .0 .3 .4 .4 .3 .3 .5 .5 .4
.4 .3 .3 .3 .3 .3 .6 .5 .1 .0 .1 .2 .2 .3 .3 .3 .3 .4 .3 .2 .2 .2 .1 .5 .4 -1.2 -1.9 -1.3 .2 .1 .2 .1 .3 .3 .3 .3
.3 .2 .3 .3 .3 .3 .2 .4 .1 .1 .1 .1 .2 .3 .3 .3 .3 .5 .3 .0 .1 .1 .2 .3 .4 .2 -.3 -.5 .2 .0 .1 .2 .2 .3 .3 .2
.2 .1 .2 .3 .3 .2 .2 .2 .1 .1 .1 .1 .2 .3 .3 .3 .2 .1 .0 .0 .2 .5 .4 .2 .1 .1 .1 -.1 -.1 .2 .1 .2 .2 .2 .2 .1
.0 .0 .0 .1 .1 .1 .0 .0 .1 .1 -.3 .1 .0 .2 .2 .1 .0 -.6 -.4 -.4 -.5 .3 .4 .1 .1 .0 -.1 -.1 .0 .0 .1 .2 .0 .0 -.1 -.1
.0 .1 .1 .2 .2 .2 .2 .2 .2 .2 -.2 -.2 -.3 -.1 .1 .2 .2 .2 .1 -.2 -.2 .2 .2 .0 -.1 -.2 -.1 -.1 -.1 .0 .0 .0 -.2 .0 -.1 -.1
.0 .1 .0 .2 .2 .3 .3 .3 .3 .3 .1 .1 -.1 .2 .2 .3 .2 .2 .3 .5 .3 .2 .1 .0 .1 .1 .1 .1 .2 .1 .3 .4 .2 .2 .1 .0
.3 .3 .2 .1 .2 .2 .2 .3 .3 .4 .3 .1 .0 .2 .3 .3 .2 .3 .4 .4 .4 .3 .2 .1 .2 .3 .3 .4 .3 .3 .3 .5 .4 .2 .3 .2
.3 .4 .4 .3 .3 .3 .2 .3 .4 .4 .4 .3 .1 .3 .3 .4 .3 .4 .3 .3 .3 .3 .3 .3 .3 .4 .4 .4 .4 .3 .3 .3 .5 .3 .3 .3
.5 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .5 .4 .4 .5 .3 .5 .4 .4 .4 .4 .4 .4 .5 .5 .4 .4 .4 .4 .4 .4 .4 .3
.5 .4 .3 .4 .4 .4 .4 .3 .4 .3 .2 .3 .4 .4 .4 .4 .4 .3 .3 .4 .4 .4 .4 .4 .4 .4 .4 .3 .4 .4 .4 .4 .4 .3 .4 .4
.2 .3 .3 .4 .4 .4 .4 .3 .3 .3 .3 .2 .0 .1 .1 .2 .2 .2 .2 .2 .2 .2 .1 -.1 .1 .2 .1 .1 .0 -.1 .1 .1 -.1 .1 .2 .2
.1 .0 .0 -.2 -.4 -.5 -.4 -.3 -.3 .0 .0 -.1 .0 .2 .1 -.1 -.6 -1.2 -2.1 -2.0 -1.8 -2.1 -2.3 -2.1 -1.8 -1.9 -1.8 -.9 -1.7 -2.5 -2.9 -2.2 -1.9 -1.5 .2 .0
-.9 -.9 -.8 -.5 -.5 -.6 -.8 -1.3 -1.3 -.2 -.3 -.6 -.6 -.6 -.9 -1.2 -1.6 -2.2 -2.6 -2.8 -3.1 -3.4 -3.6 -3.4 -3.6 -5.0 -6.1 -5.8 -5.3 -4.3 -4.0 -3.7 -3.2 -1.4 -1.1 -1.1
150°W 120°W 90°W 60°W 30°W 0° 30°E 60°E 90°E 120°E 150°E

Figure 35. ATOVS SD O-B brightness temperature differences (deg C). APRIL 2003
Channel: AMSUA-5 (700 hPa)
NOAA15, using all observations

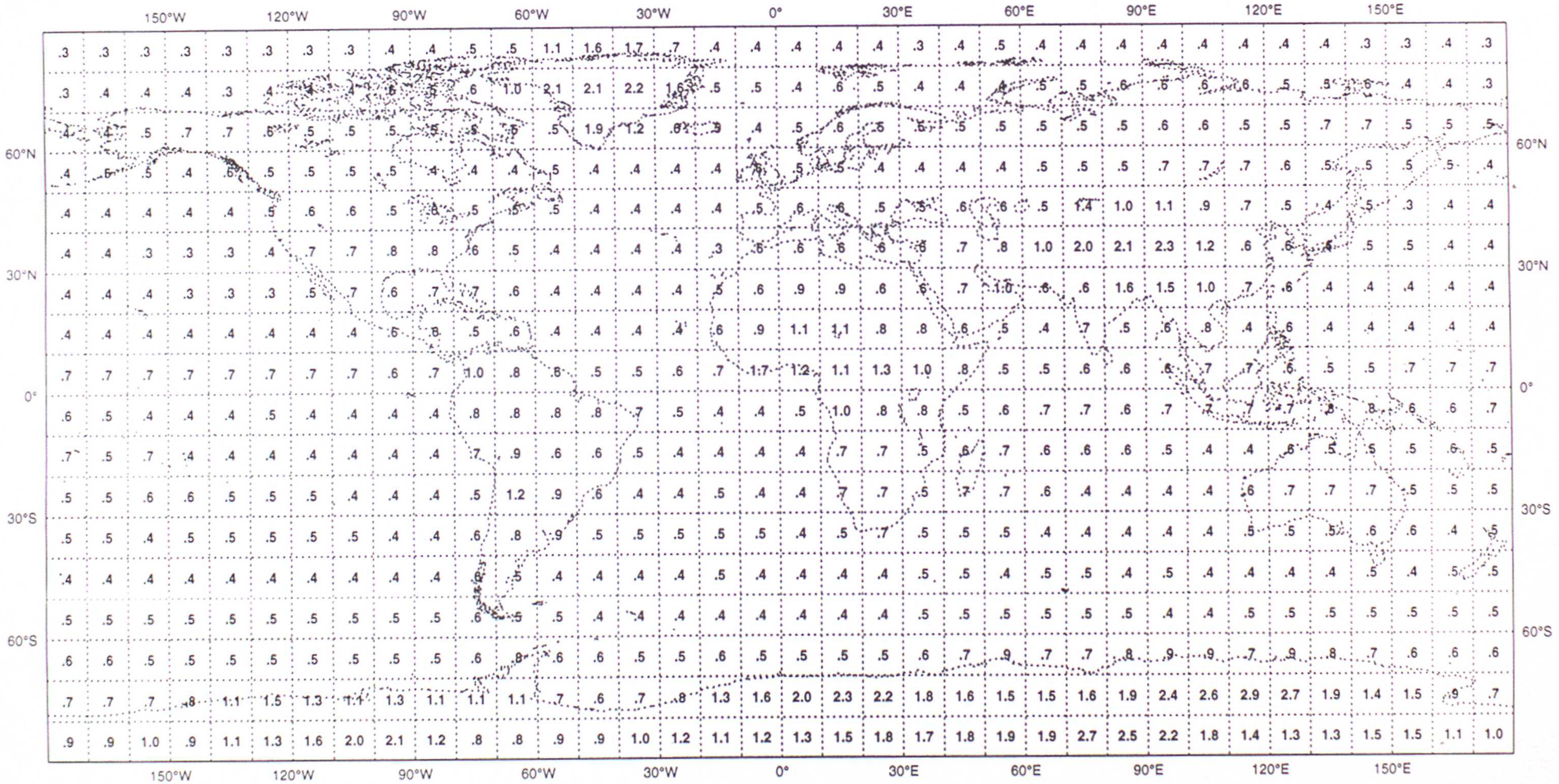

150°W 120°W 90°W 60°W 30°W 0° 30°E 60°E 90°E 120°E 150°E
60°N
30°N
0°
30°S
60°S
.3 .3 .3 .3 .3 .3 .3 .3 .4 .4 .5 .5 1.1 1.6 1.7 .7 .4 .4 .4 .4 .4 .3 .4 .5 .4 .4 .4 .4 .4 .4 .4 .4 .3 .3 .4 .3
.3 .4 .4 .4 .3 .4 .4 .4 .6 .5 .6 1.0 2.1 2.1 2.2 1.6 .5 .5 .4 .6 .5 .4 .4 .4 .5 .5 .6 .6 .6 .6 .5 .5 .6 .4 .4 .3
.4 .4 .5 .7 .7 .6 .5 .5 .5 .5 .5 .5 .5 1.9 1.2 .6 .5 .4 .5 .6 .5 .5 .5 .5 .5 .5 .5 .6 .6 .5 .5 .7 .7 .5 .5 .5
.4 .5 .5 .4 .6 .5 .5 .5 .5 .4 .4 .4 .5 .4 .4 .4 .4 .6 .5 .5 .4 .4 .4 .4 .5 .5 .5 .7 .7 .7 .6 .5 .5 .5 .5 .4
.4 .4 .4 .4 .4 .5 .6 .6 .5 .8 .5 .5 .5 .4 .4 .4 .4 .5 .6 .6 .5 .5 .6 .6 .5 1.4 1.0 1.1 .9 .7 .5 .4 .5 .3 .4 .4
.4 .4 .3 .3 .3 .4 .7 .7 .8 .8 .6 .5 .4 .4 .4 .4 .3 .6 .6 .6 .6 .6 .7 .8 1.0 2.0 2.1 2.3 1.2 .6 .6 .4 .5 .5 .4 .4
.4 .4 .4 .3 .3 .3 .5 .7 .6 .7 .7 .6 .4 .4 .4 .4 .5 .6 .9 .9 .6 .6 .7 1.0 .6 .6 1.6 1.5 1.0 .7 .6 .4 .4 .4 .4 .4
.4 .4 .4 .4 .4 .4 .4 .4 .6 .8 .5 .6 .4 .4 .4 .4 .6 .9 1.1 1.1 .8 .8 .6 .5 .4 .7 .5 .6 .8 .4 .6 .4 .4 .4 .4 .4
.7 .7 .7 .7 .7 .7 .7 .7 .6 .7 1.0 .8 .8 .5 .5 .6 .7 1.7 1.2 1.1 1.3 1.0 .8 .5 .5 .6 .6 .6 .7 .7 .6 .5 .5 .7 .7 .7
.6 .5 .4 .4 .4 .5 .4 .4 .4 .4 .8 .8 .8 .8 .7 .5 .4 .4 .5 1.0 .8 .8 .5 .6 .7 .7 .6 .7 .7 .7 .7 .8 .8 .6 .6 .7
.7 .5 .7 .4 .4 .4 .4 .4 .4 .4 .7 .9 .6 .6 .5 .4 .4 .4 .4 .7 .7 .5 .6 .7 .6 .6 .6 .5 .4 .4 .6 .5 .5 .5 .6 .5
.5 .5 .6 .6 .5 .5 .5 .4 .4 .4 .5 1.2 .9 .6 .4 .4 .5 .4 .4 .7 .7 .5 .7 .7 .6 .4 .4 .4 .4 .6 .7 .7 .7 .5 .5 .5
.5 .5 .4 .5 .5 .5 .5 .5 .4 .4 .6 .8 .9 .5 .5 .5 .5 .5 .4 .5 .7 .5 .5 .5 .4 .4 .4 .4 .4 .5 .5 .5 .6 .6 .4 .5
.4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .6 .5 .4 .4 .4 .4 .5 .4 .4 .4 .4 .5 .5 .4 .5 .5 .4 .5 .4 .4 .4 .4 .5 .4 .5 .5
.5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .6 .5 .5 .4 .4 .4 .4 .4 .4 .4 .4 .5 .5 .5 .5 .5 .5 .4 .4 .5 .5 .5 .5 .5 .5 .5
.6 .6 .5 .5 .5 .5 .5 .5 .5 .5 .6 .8 .6 .6 .5 .5 .6 .5 .5 .5 .5 .6 .7 .9 .7 .7 .8 .9 .9 .7 .9 .8 .7 .6 .6 .6
.7 .7 .7 .8 1.1 1.5 1.3 1.1 1.3 1.1 1.1 1.1 .7 .6 .7 .8 1.3 1.6 2.0 2.3 2.2 1.8 1.6 1.5 1.5 1.6 1.9 2.4 2.6 2.9 2.7 1.9 1.4 1.5 .9 .7
.9 .9 1.0 .9 1.1 1.3 1.6 2.0 2.1 1.2 .8 .8 .9 .9 1.0 1.2 1.1 1.2 1.3 1.5 1.8 1.7 1.8 1.9 1.9 2.7 2.5 2.2 1.8 1.4 1.3 1.3 1.5 1.5 1.1 1.0

Figure 36. ATOVS MEAN O-B brightness temperature differences (deg C). APRIL 2003
Channel: AMSUA-7 (300 hPa)
NOAA15, using all observations

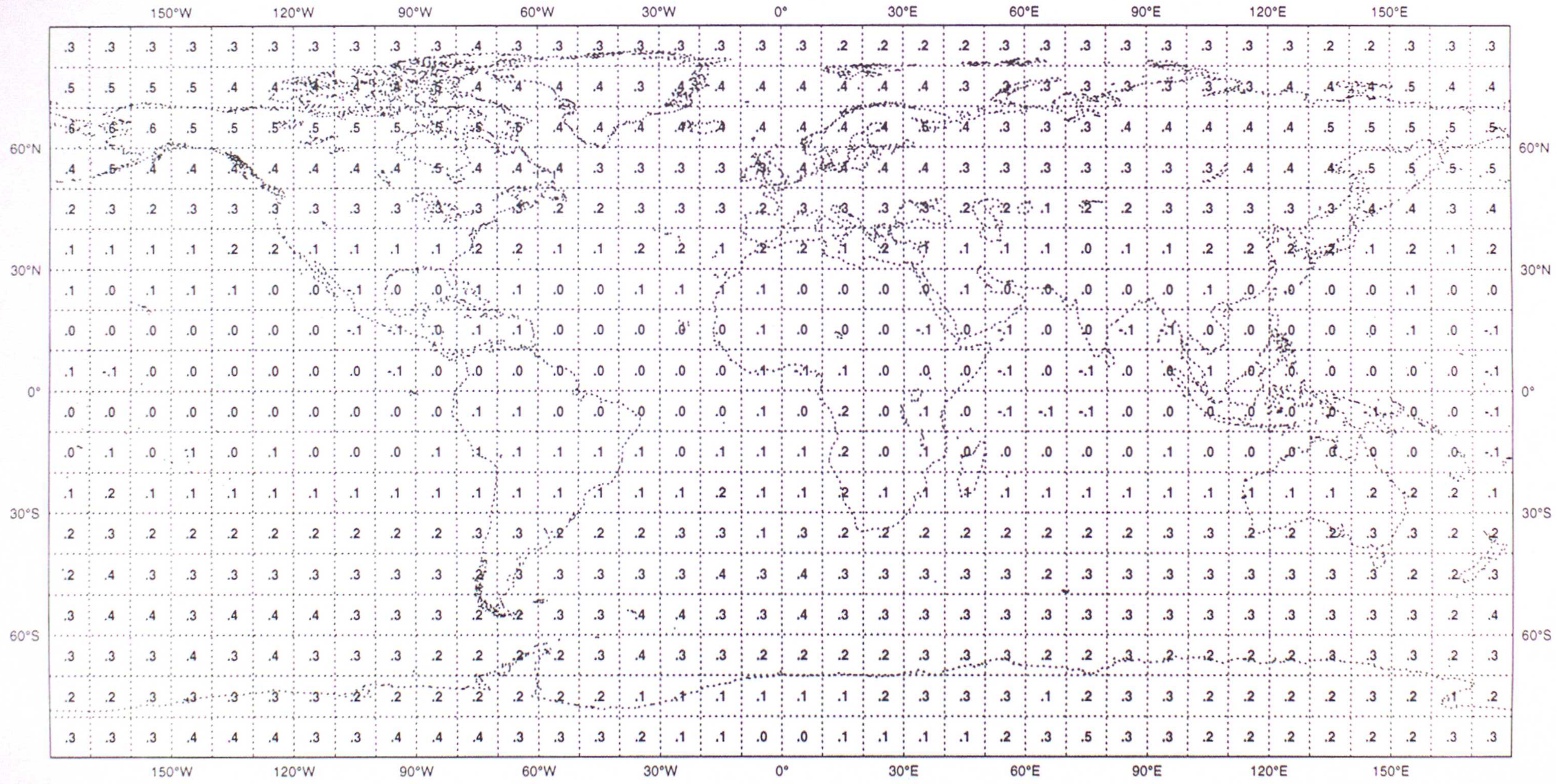

150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S
.3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .4 .3 .3 .3 .3 .3 .3 .3 .3 .2 .2 .2 .2 .3 .3 .3 .3 .3 .3 .3 .3 .2 .2 .3 .3 .3
.5 .5 .5 .5 .4 .4 .4 .4 .4 .5 .4 .4 .4 .4 .3 .4 .4 .4 .4 .4 .4 .4 .3 .2 .3 .3 .3 .3 .3 .3 .4 .4 .4 .5 .4 .4
.6 .6 .6 .5 .5 .5 .5 .5 .5 .5 .5 .5 .4 .4 .4 .4 .4 .4 .4 .4 .5 .4 .3 .3 .3 .4 .4 .4 .4 .4 .5 .5 .5 .5 .5
.4 .5 .4 .4 .4 .4 .4 .4 .4 .5 .4 .4 .4 .3 .3 .3 .3 .3 .4 .4 .4 .4 .3 .3 .3 .3 .3 .3 .3 .4 .4 .4 .5 .5 .5 .5
.2 .3 .2 .3 .3 .3 .3 .3 .3 .3 .3 .3 .2 .2 .3 .3 .3 .2 .3 .3 .3 .3 .2 .2 .1 .2 .2 .3 .3 .3 .3 .3 .4 .4 .3 .4
.1 .1 .1 .1 .2 .2 .1 .1 .1 .1 .2 .2 .1 .1 .2 .2 .1 .2 .2 .1 .2 .1 .1 .1 .1 .0 .1 .1 .2 .2 .2 .2 .1 .2 .1 .2
.1 .0 .1 .1 .1 .0 .0 -.1 .0 .0 .1 .1 .0 .0 .1 .1 .1 .1 .0 .0 .0 .0 .1 .0 .0 .0 .0 .0 .1 .0 .0 .0 .0 .1 .0 .0
.0 .0 .0 .0 .0 .0 .0 -.1 -.1 .0 .1 .1 .0 .0 .0 .0 .0 .1 .0 .0 .0 -.1 .0 -.1 .0 .0 -.1 -.1 .0 .0 .0 .0 .0 .1 .0 -.1
.1 -.1 .0 .0 .0 .0 .0 .0 -.1 .0 .0 .0 .0 .0 .0 .0 .0 .1 -.1 .1 .0 .0 .0 -.1 .0 -.1 .0 .0 .1 .0 .0 .0 .0 .0 .0 -.1
.0 .0 .0 .0 .0 .0 .0 .0 .0 .0 .1 .1 .0 .0 .0 .0 .0 .1 .0 .2 .0 .1 .0 -.1 -.1 -.1 .0 .0 .0 .0 .0 .0 -.1 .0 .0 -.1
.0 .1 .0 .1 .0 .1 .0 .0 .0 .1 .1 .1 .1 .1 .1 .0 .1 .1 .1 .2 .0 .1 .0 .0 .0 .0 .0 .1 .0 .0 .0 .0 .0 .0 .0 -.1
.1 .2 .1 .1 .1 .1 .1 .1 .1 .1 .1 .1 .1 .1 .1 .1 .2 .1 .1 .2 .1 .1 .1 .1 .1 .1 .1 .1 .1 .1 .1 .1 .2 .2 .2 .1
.2 .3 .2 .2 .2 .2 .2 .2 .2 .2 .3 .3 .2 .2 .2 .3 .3 .1 .3 .2 .2 .2 .2 .2 .2 .2 .2 .3 .3 .2 .2 .2 .3 .3 .2 .2
.2 .4 .3 .3 .3 .3 .3 .3 .3 .3 .2 .3 .3 .3 .3 .3 .4 .3 .4 .3 .3 .3 .3 .3 .2 .3 .3 .3 .3 .3 .3 .3 .3 .2 .2 .3
.3 .4 .4 .3 .4 .4 .4 .3 .3 .3 .2 .2 .3 .3 .4 .4 .3 .3 .4 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .2 .4
.3 .3 .3 .4 .3 .4 .3 .3 .3 .2 .2 .2 .2 .3 .4 .3 .3 .2 .2 .2 .2 .3 .3 .3 .2 .2 .3 .2 .2 .2 .2 .3 .3 .3 .2 .3
.2 .2 .3 .3 .3 .3 .3 .2 .2 .2 .2 .2 .2 .2 .1 .1 .1 .1 .1 .1 .2 .3 .3 .3 .1 .2 .3 .3 .2 .2 .2 .2 .3 .2 .1 .2
.3 .3 .3 .4 .4 .4 .3 .3 .4 .4 .4 .3 .3 .3 .2 .1 .1 .0 .0 .1 .1 .1 .1 .2 .3 .5 .3 .3 .2 .2 .2 .2 .2 .2 .3 .3

Figure 37. ATOVS SD O-B brightness temperature differences (deg C). APRIL 2003
Channel: AMSUA-7 (300 hPa)
NOAA15, using all observations

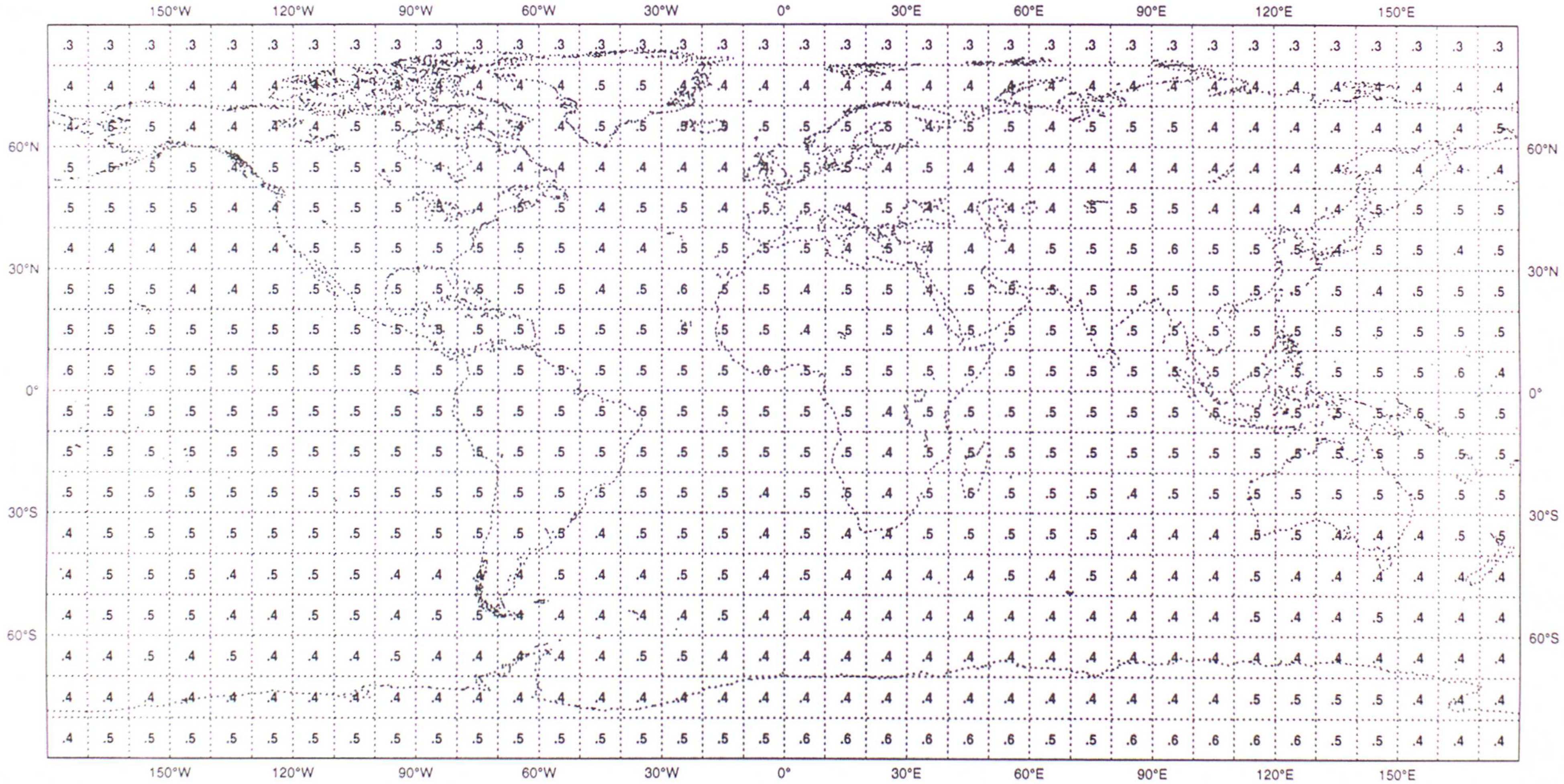
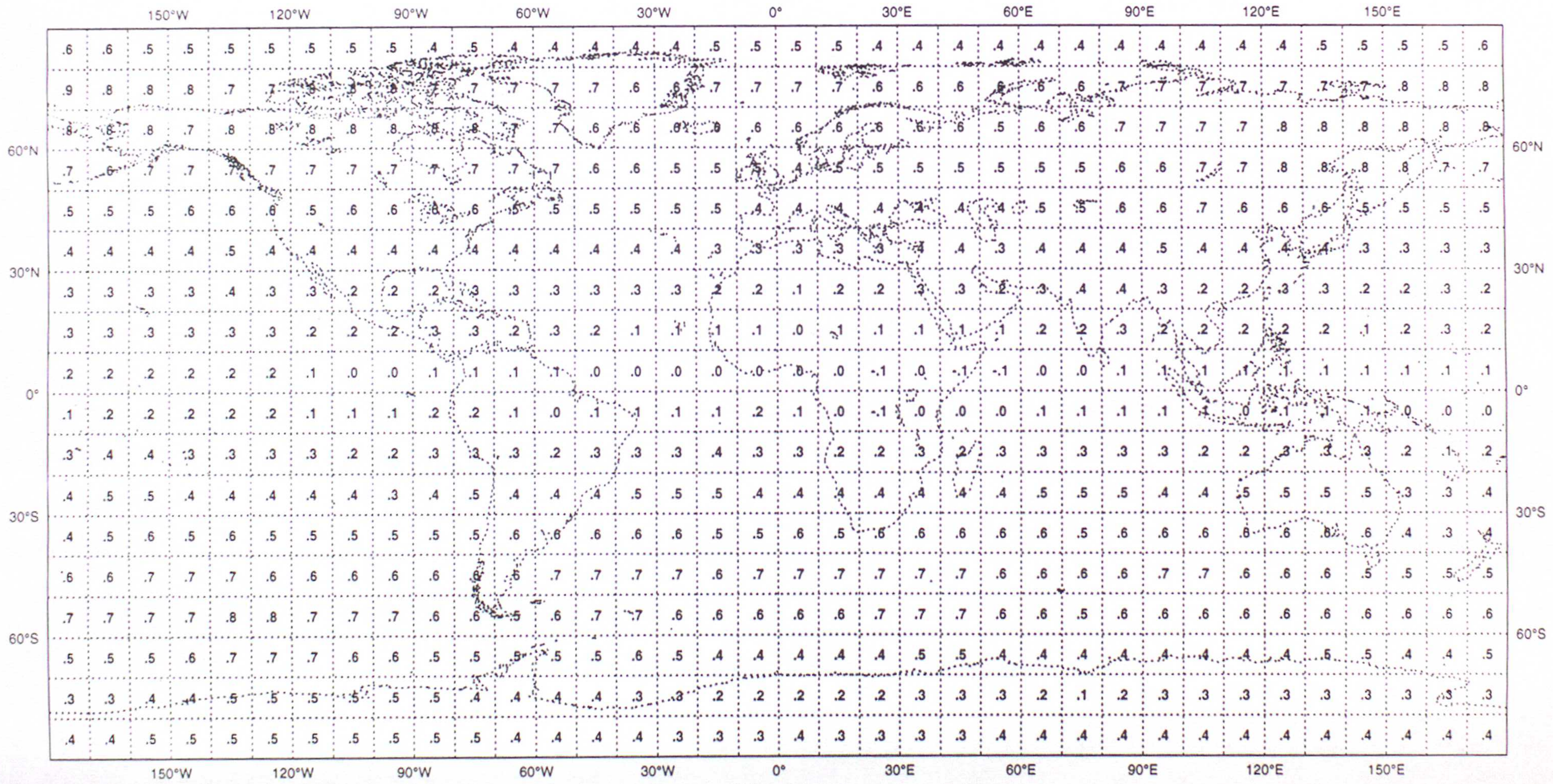

150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S
.3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3
.4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .5 .5 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4
.4 .6 .5 .4 .4 .4 .4 .5 .5 .4 .4 .4 .4 .5 .5 .5 .5 .5 .5 .5 .5 .4 .5 .5 .4 .5 .5 .5 .4 .4 .4 .4 .4 .4 .4 .5
.5 .5 .5 .5 .4 .5 .5 .5 .5 .4 .4 .4 .4 .4 .4 .4 .4 .4 .5 .5 .4 .5 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4
.5 .5 .5 .5 .4 .4 .5 .5 .5 .5 .4 .5 .5 .4 .5 .5 .4 .5 .5 .4 .5 .4 .4 .4 .4 .5 .5 .5 .4 .4 .4 .4 .5 .5 .5 .5
.4 .4 .4 .4 .4 .4 .5 .5 .5 .5 .5 .5 .5 .4 .4 .5 .5 .5 .5 .4 .5 .4 .4 .4 .5 .5 .5 .6 .5 .5 .5 .4 .5 .5 .4 .5
.5 .5 .5 .4 .4 .5 .5 .5 .5 .5 .5 .5 .5 .4 .5 .6 .5 .5 .4 .5 .5 .4 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .4 .5 .5 .5
.5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .4 .5 .5 .4 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5
.6 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .6 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .6 .4
.5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .6 .5 .5 .5 .5 .5 .4 .5 .5 .5 .5 .5 .5 .5 .6 .5 .5 .5 .5 .6 .5 .5
.5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .4 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5
.5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .4 .5 .6 .4 .5 .6 .5 .5 .5 .4 .5 .5 .5 .5 .5 .5 .5 .5 .5
.4 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .4 .5 .5 .5 .4 .5 .4 .4 .5 .5 .5 .5 .5 .4 .4 .4 .5 .5 .4 .4 .4 .5 .5
.4 .5 .5 .5 .4 .5 .5 .5 .4 .4 .4 .4 .5 .4 .4 .5 .5 .4 .5 .4 .4 .4 .4 .5 .4 .5 .4 .4 .4 .5 .4 .4 .4 .4 .4 .4
.4 .5 .5 .5 .4 .4 .5 .5 .4 .5 .5 .4 .4 .4 .4 .4 .5 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .5 .4 .4 .5 .4 .4 .4
.4 .4 .5 .4 .5 .4 .4 .4 .5 .4 .4 .4 .4 .4 .5 .5 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4
.4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .5 .5 .5 .5 .4 .4 .4
.4 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .6 .6 .6 .6 .6 .6 .5 .5 .6 .6 .6 .6 .6 .5 .5 .4 .4 .4

Figure 38. ATOVS MEAN O-B brightness temperature differences (deg C). APRIL 2003
Channel: AMSUA-9 (100 hPa)
NOAA15, using all observations



.6	.6	.5	.5	.5	.5	.5	.5	.5	.4	.5	.4	.4	.4	.4	.4	.5	.5	.5	.5	.4	.4	.4	.4	.4	.4	.4	.4	.4	.4	.4	.5	.5	.5	.5	.6
.9	.8	.8	.8	.7	.7	.8	.8	.8	.7	.7	.7	.7	.7	.6	.6	.7	.7	.7	.7	.6	.6	.6	.6	.6	.6	.7	.7	.7	.7	.7	.7	.7	.8	.8	.8
.8	.8	.8	.7	.8	.8	.8	.8	.8	.8	.8	.7	.7	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.5	.6	.6	.7	.7	.7	.7	.8	.8	.8	.8	.8	.8
.7	.6	.7	.7	.7	.7	.7	.7	.7	.7	.7	.7	.7	.6	.6	.5	.5	.5	.4	.5	.5	.5	.5	.5	.5	.5	.6	.6	.7	.7	.8	.8	.8	.8	.7	.7
.5	.5	.5	.6	.6	.6	.5	.6	.6	.6	.6	.5	.5	.5	.5	.5	.5	.4	.4	.4	.4	.4	.4	.4	.5	.5	.6	.6	.7	.6	.6	.6	.5	.5	.5	.5
.4	.4	.4	.4	.5	.4	.4	.4	.4	.4	.4	.4	.4	.4	.4	.4	.3	.3	.3	.3	.3	.4	.4	.3	.4	.4	.4	.5	.4	.4	.4	.4	.3	.3	.3	.3
.3	.3	.3	.3	.4	.3	.3	.2	.2	.2	.3	.3	.3	.3	.3	.3	.2	.2	.1	.2	.2	.3	.3	.2	.3	.4	.4	.3	.2	.2	.3	.3	.2	.2	.3	.2
.3	.3	.3	.3	.3	.3	.2	.2	.2	.3	.3	.2	.3	.2	.1	.1	.1	.1	.0	.1	.1	.1	.1	.1	.2	.2	.3	.2	.2	.2	.2	.2	.1	.2	.3	.2
.2	.2	.2	.2	.2	.2	.1	.0	.0	.1	.1	.1	.1	.0	.0	.0	.0	.0	.0	.0	-.1	.0	-.1	-.1	.0	.0	.1	.1	.1	.1	.1	.1	.1	.1	.1	.1
.1	.2	.2	.2	.2	.2	.1	.1	.1	.2	.2	.1	.0	.1	.1	.1	.1	.2	.1	.0	-.1	.0	.0	.0	.1	.1	.1	.1	.1	.0	.1	.1	.1	.0	.0	.0
.3	.4	.4	.3	.3	.3	.3	.2	.2	.3	.3	.3	.2	.3	.3	.3	.4	.3	.3	.2	.2	.3	.2	.3	.3	.3	.3	.3	.2	.2	.3	.3	.3	.2	.1	.2
.4	.5	.5	.4	.4	.4	.4	.4	.3	.4	.5	.4	.4	.4	.5	.5	.5	.4	.4	.4	.4	.4	.4	.4	.5	.5	.5	.4	.4	.5	.5	.5	.5	.3	.3	.4
.4	.5	.6	.5	.6	.5	.5	.5	.5	.5	.5	.6	.6	.6	.6	.6	.5	.5	.6	.5	.6	.6	.6	.6	.6	.5	.6	.6	.6	.6	.6	.6	.6	.4	.3	.4
.6	.6	.7	.7	.7	.6	.6	.6	.6	.6	.6	.6	.7	.7	.7	.7	.6	.7	.7	.7	.7	.7	.7	.6	.6	.6	.6	.7	.7	.6	.6	.6	.5	.5	.5	.5
.7	.7	.7	.7	.8	.8	.7	.7	.7	.6	.6	.5	.6	.7	.7	.6	.6	.6	.6	.6	.7	.7	.7	.6	.6	.5	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6
.5	.5	.5	.6	.7	.7	.7	.6	.6	.5	.5	.5	.5	.5	.6	.5	.4	.4	.4	.4	.4	.5	.5	.4	.4	.4	.4	.4	.4	.4	.4	.5	.5	.4	.4	.5
.3	.3	.4	.4	.5	.5	.5	.5	.5	.5	.4	.4	.4	.4	.3	.3	.2	.2	.2	.2	.2	.3	.3	.3	.2	.1	.2	.3	.3	.3	.3	.3	.3	.3	.3	.3
.4	.4	.5	.5	.5	.5	.5	.5	.5	.5	.5	.4	.4	.4	.4	.3	.3	.3	.4	.3	.3	.3	.3	.4	.4	.4	.4	.4	.4	.4	.4	.4	.4	.4	.4	.4

Figure 39. ATOVS SD O-B brightness temperature differences (deg C). APRIL 2003
Channel: AMSUA-9 (100 hPa)
NOAA15, using all observations

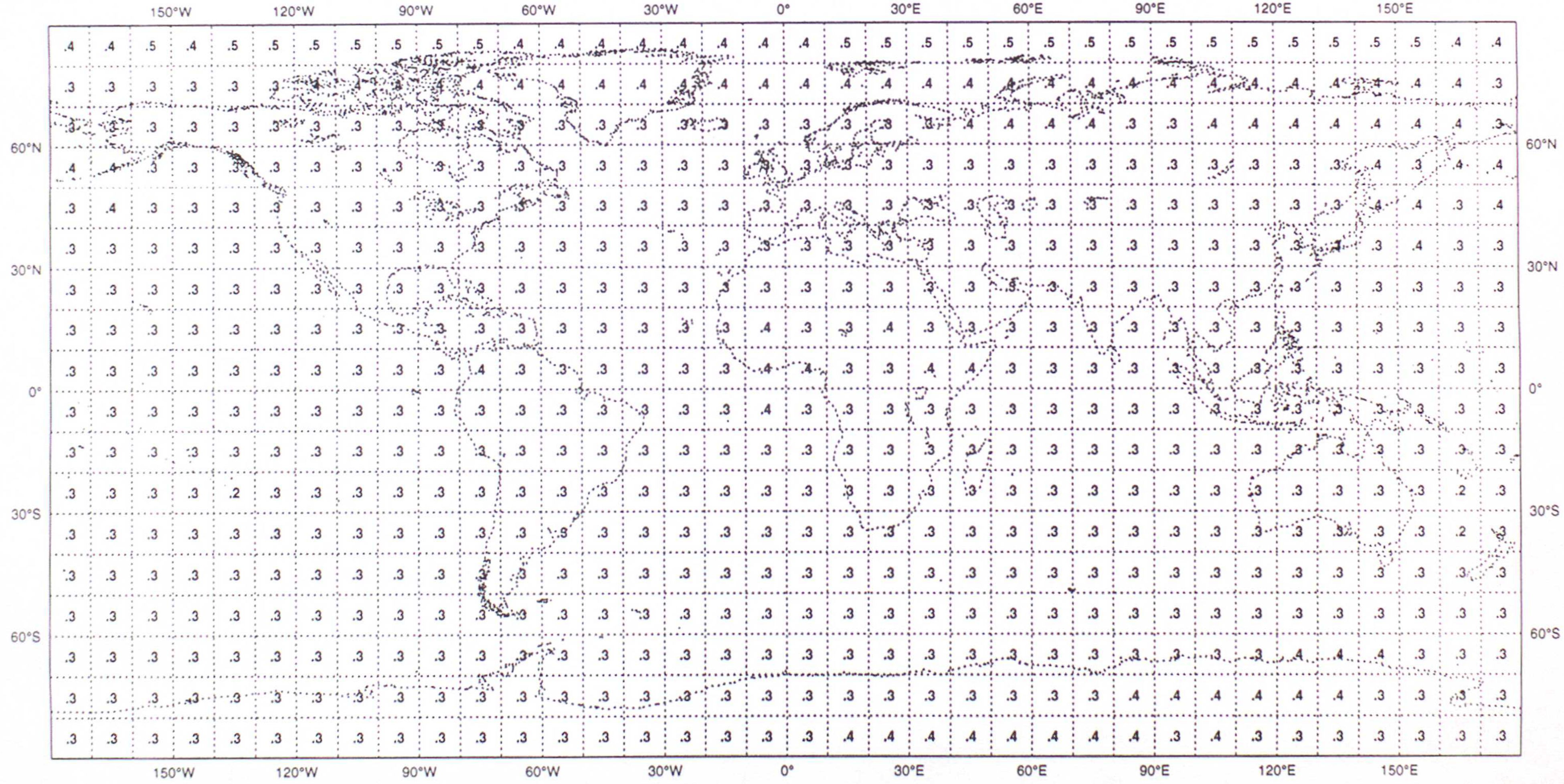
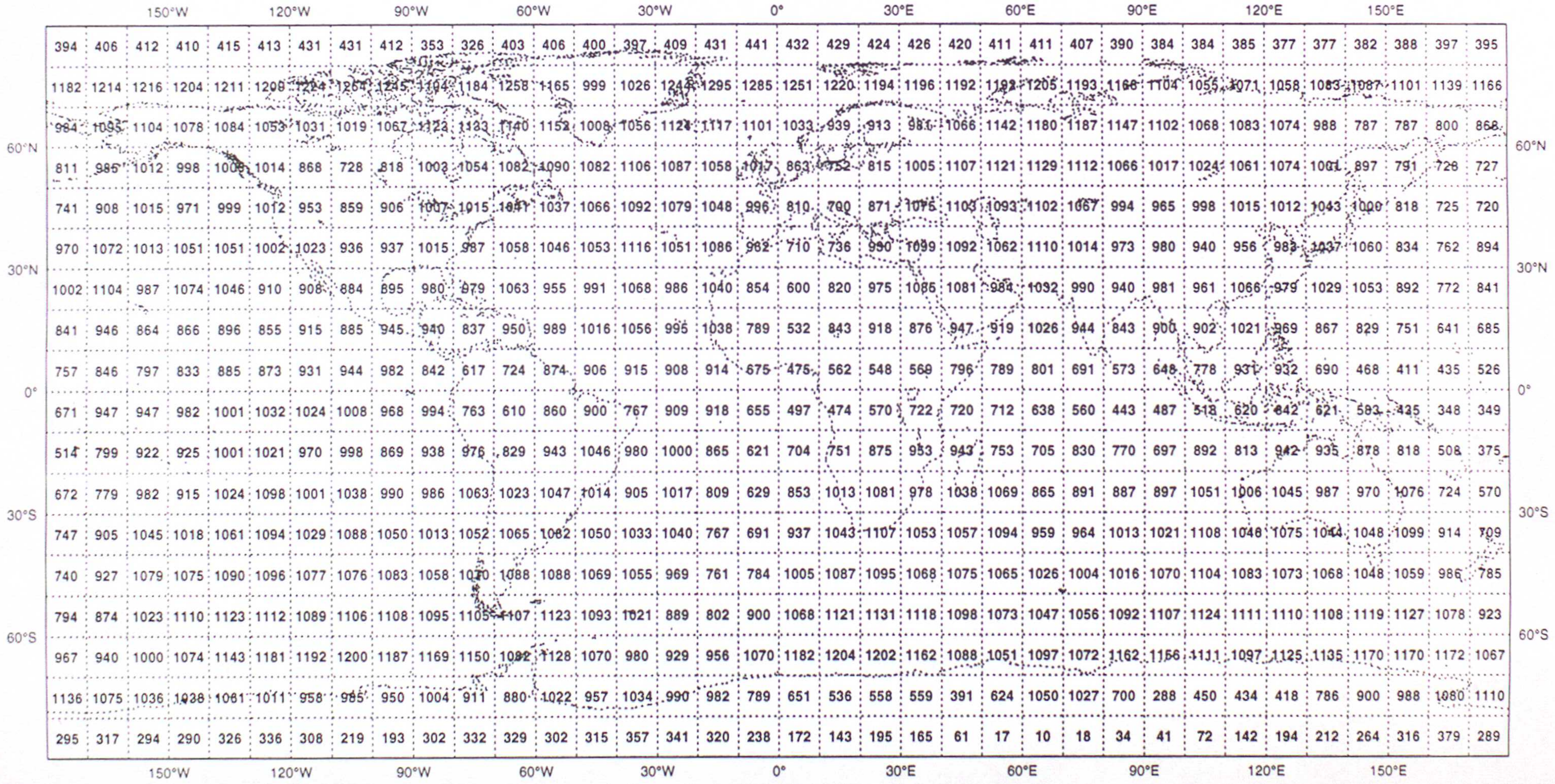

150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S

Figure 40. ATOVS mean daily count. APRIL 2003
NOAA16, using all observations
Global average number of observations in 24 hours = 573485



394	406	412	410	415	413	431	431	412	353	326	403	406	400	397	409	431	441	432	429	424	426	420	411	411	407	390	384	384	385	377	377	382	388	397	395
1182	1214	1216	1204	1211	1209	1224	1264	1245	1104	1184	1258	1165	999	1026	1244	1295	1285	1251	1220	1194	1196	1192	1192	1205	1193	1166	1104	1055	1071	1058	1083	1087	1101	1139	1166
984	1095	1104	1078	1084	1053	1031	1019	1067	1122	1133	1140	1152	1008	1056	1124	1117	1101	1033	939	913	981	1066	1142	1180	1187	1147	1102	1068	1083	1074	988	787	787	800	868
811	985	1012	998	1009	1014	868	728	818	1003	1054	1082	1090	1082	1106	1087	1058	1017	863	752	815	1005	1107	1121	1129	1112	1066	1017	1024	1061	1074	1001	897	791	726	727
741	908	1015	971	999	1012	953	859	906	1007	1015	1041	1037	1066	1092	1079	1048	996	810	700	871	1075	1103	1093	1102	1067	994	965	998	1015	1012	1043	1000	818	725	720
970	1072	1013	1051	1051	1002	1023	936	937	1015	987	1058	1046	1053	1116	1051	1086	962	710	736	990	1099	1092	1062	1110	1014	973	980	940	956	983	1037	1060	834	762	894
1002	1104	987	1074	1046	910	908	884	895	980	979	1063	955	991	1068	986	1040	854	600	820	975	1085	1081	984	1032	990	940	981	961	1066	979	1029	1053	892	772	841
841	946	864	866	896	855	915	885	945	940	837	950	989	1016	1056	995	1038	789	532	843	918	876	947	919	1026	944	843	900	902	1021	969	867	829	751	641	685
757	846	797	833	885	873	931	944	982	842	617	724	874	906	915	908	914	675	475	562	548	569	796	789	801	691	573	648	778	931	932	690	468	411	435	526
671	947	947	982	1001	1032	1024	1008	968	994	763	610	860	900	767	909	918	655	497	474	570	722	720	712	638	560	443	487	518	620	642	621	583	435	348	349
514	799	922	925	1001	1021	970	998	869	938	976	829	943	1046	980	1000	865	621	704	751	875	953	943	753	705	830	770	697	892	813	942	935	878	818	508	375
672	779	982	915	1024	1098	1001	1038	990	986	1063	1023	1047	1014	905	1017	809	629	853	1013	1081	978	1038	1069	865	891	887	897	1051	1006	1045	987	970	1076	724	570
747	905	1045	1018	1061	1094	1029	1088	1050	1013	1052	1065	1062	1050	1033	1040	767	691	937	1043	1107	1053	1057	1094	959	964	1013	1021	1108	1046	1075	1044	1048	1099	914	709
740	927	1079	1075	1090	1096	1077	1076	1083	1058	1070	1088	1088	1069	1055	969	761	784	1005	1087	1095	1068	1075	1065	1026	1004	1016	1070	1104	1083	1073	1068	1048	1059	986	785
794	874	1023	1110	1123	1112	1089	1106	1108	1095	1105	1107	1123	1093	1021	889	802	900	1068	1121	1131	1118	1098	1073	1047	1056	1092	1107	1124	1111	1110	1108	1119	1127	1078	923
967	940	1000	1074	1143	1181	1192	1200	1187	1169	1150	1092	1128	1070	980	929	956	1070	1182	1204	1202	1162	1088	1051	1097	1072	1162	1156	1111	1097	1125	1135	1170	1170	1172	1067
1136	1075	1036	1038	1061	1011	958	985	950	1004	911	880	1022	957	1034	990	982	789	651	536	558	559	391	624	1050	1027	700	288	450	434	418	786	900	988	1080	1110
295	317	294	290	326	336	308	219	193	302	332	329	302	315	357	341	320	238	172	143	195	165	61	17	10	18	34	41	72	142	194	212	264	316	379	289

Figure 41. ATOVS MEAN O-B brightness temperature differences (deg C). APRIL 2003
Channel: HIRS8 (Surface)
NOAA16, using all observations

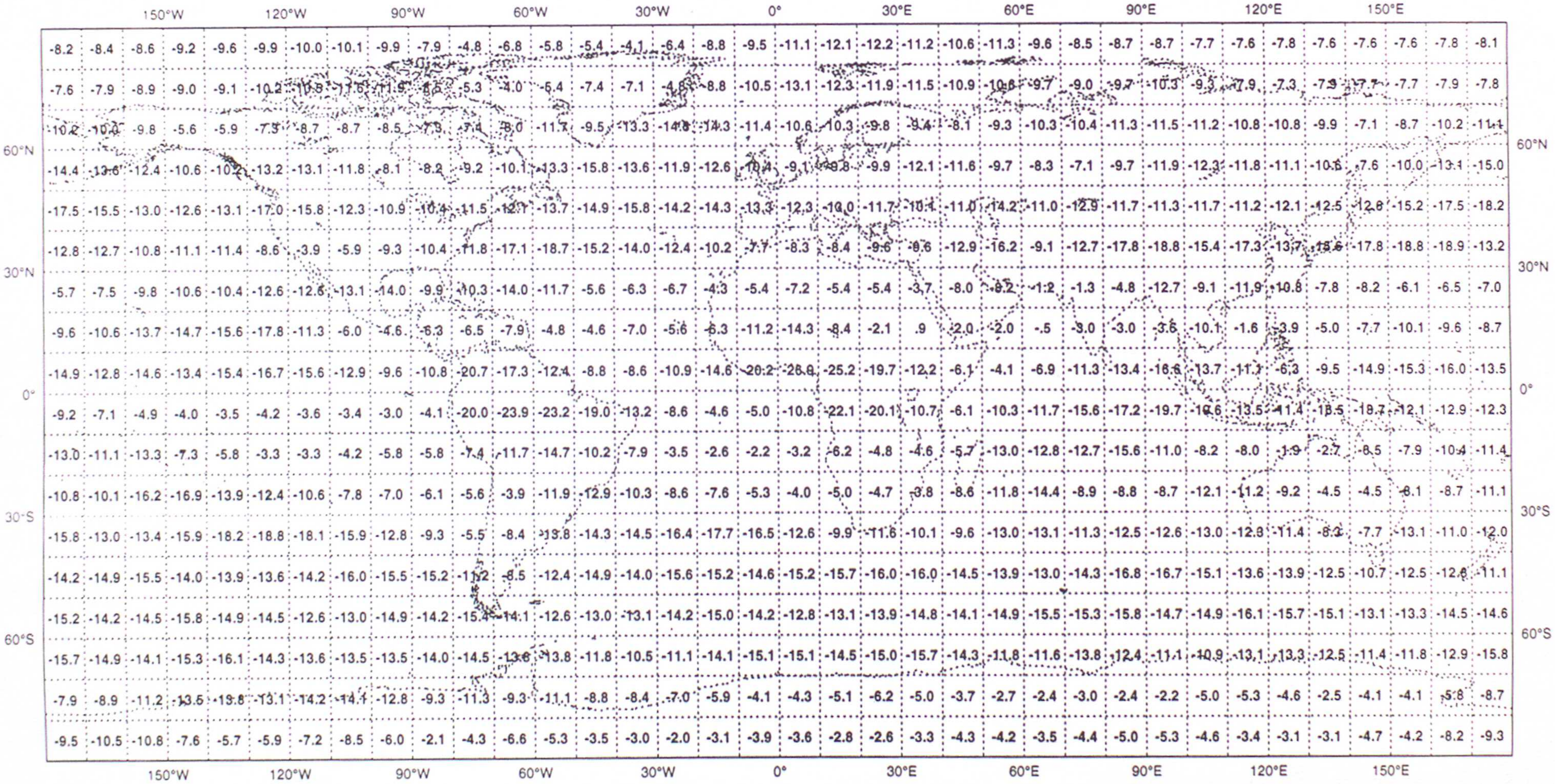
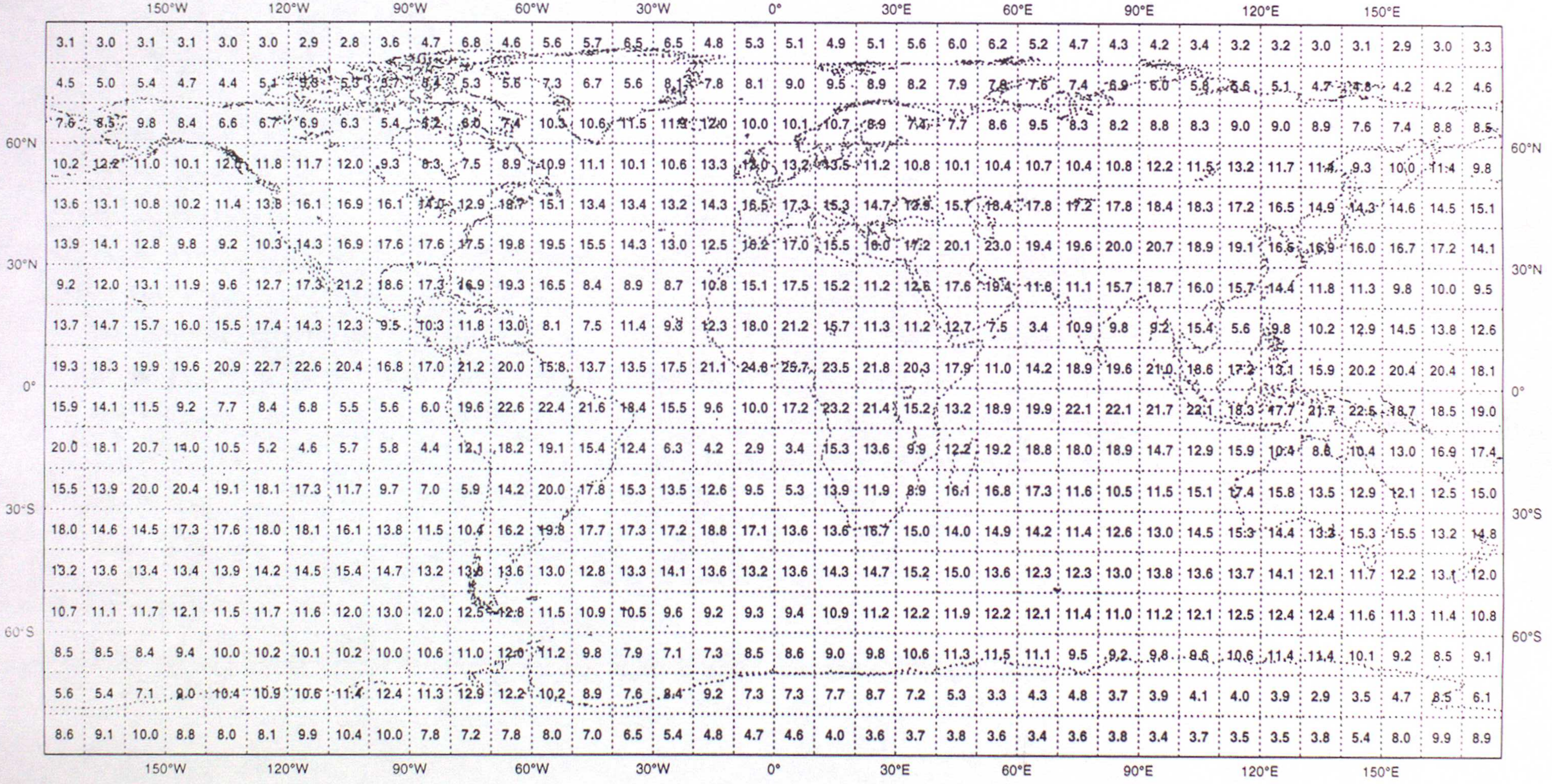

150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S
-8.2 -8.4 -8.6 -9.2 -9.6 -9.9 -10.0 -10.1 -9.9 -7.9 -4.8 -6.8 -5.8 -5.4 -4.1 -6.4 -8.8 -9.5 -11.1 -12.1 -12.2 -11.2 -10.6 -11.3 -9.6 -8.5 -8.7 -8.7 -7.7 -7.6 -7.8 -7.6 -7.6 -7.6 -7.8 -8.1
-7.6 -7.9 -8.9 -9.0 -9.1 -10.2 -10.8 -11.6 -11.9 -8.5 -5.3 -4.0 -6.4 -7.4 -7.1 -4.8 -8.8 -10.5 -13.1 -12.3 -11.9 -11.5 -10.9 -10.6 -9.7 -9.0 -9.7 -10.3 -9.3 -7.9 -7.3 -7.3 -7.7 -7.7 -7.9 -7.8
-10.2 -10.0 -9.8 -5.6 -5.9 -7.3 -8.7 -8.7 -8.5 -7.3 -7.4 -8.0 -11.7 -9.5 -13.3 -14.8 -14.3 -11.4 -10.6 -10.3 -9.8 -9.4 -8.1 -9.3 -10.3 -10.4 -11.3 -11.5 -11.2 -10.8 -10.8 -9.9 -7.1 -8.7 -10.2 -11.1
-14.4 -13.6 -12.4 -10.6 -10.2 -13.2 -13.1 -11.8 -8.1 -8.2 -9.2 -10.1 -13.3 -15.8 -13.6 -11.9 -12.6 -10.4 -9.1 -9.8 -9.9 -12.1 -11.6 -9.7 -8.3 -7.1 -9.7 -11.9 -12.3 -11.8 -11.1 -10.6 -7.6 -10.0 -13.1 -15.0
-17.5 -15.5 -13.0 -12.6 -13.1 -17.0 -15.8 -12.3 -10.9 -10.4 -11.5 -12.1 -13.7 -14.9 -15.8 -14.2 -14.3 -13.3 -12.3 -10.0 -11.7 -10.4 -11.0 -14.2 -11.0 -12.9 -11.7 -11.3 -11.7 -11.2 -12.1 -12.5 -12.8 -15.2 -17.5 -18.2
-12.8 -12.7 -10.8 -11.1 -11.4 -8.6 -3.9 -5.9 -9.3 -10.4 -11.8 -17.1 -18.7 -15.2 -14.0 -12.4 -10.2 -7.7 -8.3 -8.4 -9.6 -8.6 -12.9 -16.2 -9.1 -12.7 -17.8 -18.8 -15.4 -17.3 -13.7 -15.6 -17.8 -18.8 -18.9 -13.2
-5.7 -7.5 -9.8 -10.6 -10.4 -12.6 -12.6 -13.1 -14.0 -9.9 -10.3 -14.0 -11.7 -5.6 -6.3 -6.7 -4.3 -5.4 -7.2 -5.4 -5.4 -3.7 -8.0 -8.2 -1.2 -1.3 -4.8 -12.7 -9.1 -11.9 -10.8 -7.8 -8.2 -6.1 -6.5 -7.0
-9.6 -10.6 -13.7 -14.7 -15.6 -17.8 -11.3 -6.0 -4.6 -6.3 -6.5 -7.9 -4.8 -4.6 -7.0 -5.6 -6.3 -11.2 -14.3 -8.4 -2.1 .9 -2.0 -2.0 -.5 -3.0 -3.0 -3.6 -10.1 -1.6 -3.9 -5.0 -7.7 -10.1 -9.6 -8.7
-14.9 -12.8 -14.6 -13.4 -15.4 -16.7 -15.6 -12.9 -9.6 -10.8 -20.7 -17.3 -12.4 -8.8 -8.6 -10.9 -14.6 -20.2 -26.8 -25.2 -19.7 -12.2 -6.1 -4.1 -6.9 -11.3 -13.4 -16.6 -13.7 -11.1 -6.3 -9.5 -14.9 -15.3 -16.0 -13.5
-9.2 -7.1 -4.9 -4.0 -3.5 -4.2 -3.6 -3.4 -3.0 -4.1 -20.0 -23.9 -23.2 -19.0 -13.2 -8.6 -4.6 -5.0 -10.8 -22.1 -20.1 -10.7 -6.1 -10.3 -11.7 -15.6 -17.2 -19.7 -16.6 -13.5 -11.4 -18.5 -18.7 -12.1 -12.9 -12.3
-13.0 -11.1 -13.3 -7.3 -5.8 -3.3 -3.3 -4.2 -5.8 -5.8 -7.4 -11.7 -14.7 -10.2 -7.9 -3.5 -2.6 -2.2 -3.2 -6.2 -4.8 -4.6 -5.7 -13.0 -12.8 -12.7 -15.6 -11.0 -8.2 -8.0 -1.9 -2.7 -8.5 -7.9 -10.4 -11.4
-10.8 -10.1 -16.2 -16.9 -13.9 -12.4 -10.6 -7.8 -7.0 -6.1 -5.6 -3.9 -11.9 -12.9 -10.3 -8.6 -7.6 -5.3 -4.0 -5.0 -4.7 -3.8 -8.6 -11.8 -14.4 -8.9 -8.8 -8.7 -12.1 -11.2 -9.2 -4.5 -4.5 -8.1 -8.7 -11.1
-15.8 -13.0 -13.4 -15.9 -18.2 -18.8 -18.1 -15.9 -12.8 -9.3 -5.5 -8.4 -13.8 -14.3 -14.5 -16.4 -17.7 -16.5 -12.6 -9.9 -11.6 -10.1 -9.6 -13.0 -13.1 -11.3 -12.5 -12.6 -13.0 -12.8 -11.4 -8.3 -7.7 -13.1 -11.0 -12.0
-14.2 -14.9 -15.5 -14.0 -13.9 -13.6 -14.2 -16.0 -15.5 -15.2 -11.2 -8.5 -12.4 -14.9 -14.0 -15.6 -15.2 -14.6 -15.2 -15.7 -16.0 -16.0 -14.5 -13.9 -13.0 -14.3 -16.8 -16.7 -15.1 -13.6 -13.9 -12.5 -10.7 -12.5 -12.6 -11.1
-15.2 -14.2 -14.5 -15.8 -14.9 -14.5 -12.6 -13.0 -14.9 -14.2 -15.4 -14.1 -12.6 -13.0 -13.1 -14.2 -15.0 -14.2 -12.8 -13.1 -13.9 -14.8 -14.1 -14.9 -15.5 -15.3 -15.8 -14.7 -14.9 -16.1 -15.7 -15.1 -13.1 -13.3 -14.5 -14.6
-15.7 -14.9 -14.1 -15.3 -16.1 -14.3 -13.6 -13.5 -13.5 -14.0 -14.5 -13.6 -13.8 -11.8 -10.5 -11.1 -14.1 -15.1 -15.1 -14.5 -15.0 -15.7 -14.3 -11.8 -11.6 -13.8 -12.4 -11.1 -10.9 -13.1 -13.3 -12.5 -11.4 -11.8 -12.9 -15.8
-7.9 -8.9 -11.2 -13.5 -13.8 -13.1 -14.2 -14.1 -12.8 -9.3 -11.3 -9.3 -11.1 -8.8 -8.4 -7.0 -5.9 -4.1 -4.3 -5.1 -6.2 -5.0 -3.7 -2.7 -2.4 -3.0 -2.4 -2.2 -5.0 -5.3 -4.6 -2.5 -4.1 -4.1 -5.8 -8.7
-9.5 -10.5 -10.8 -7.6 -5.7 -5.9 -7.2 -8.5 -6.0 -2.1 -4.3 -6.6 -5.3 -3.5 -3.0 -2.0 -3.1 -3.9 -3.6 -2.8 -2.6 -3.3 -4.3 -4.2 -3.5 -4.4 -5.0 -5.3 -4.6 -3.4 -3.1 -3.1 -4.7 -4.2 -8.2 -9.3

Figure 42. ATOVS SD O-B brightness temperature differences (deg C). APRIL 2003
Channel: HIRS8 (Surface)
NOAA16, using all observations



3.1	3.0	3.1	3.1	3.0	3.0	2.9	2.8	3.6	4.7	6.8	4.6	5.6	5.7	6.5	6.5	4.8	5.3	5.1	4.9	5.1	5.6	6.0	6.2	5.2	4.7	4.3	4.2	3.4	3.2	3.2	3.0	3.1	2.9	3.0	3.3
4.5	5.0	5.4	4.7	4.4	5.1	5.8	5.3	5.7	6.4	5.3	5.6	7.3	6.7	5.6	8.1	7.8	8.1	9.0	9.5	8.9	8.2	7.9	7.8	7.6	7.4	6.9	6.0	5.8	5.6	5.1	4.7	4.8	4.2	4.2	4.6
7.6	8.5	9.8	8.4	6.6	6.7	6.9	6.3	5.4	6.2	6.0	7.4	10.3	10.6	11.5	11.9	12.0	10.0	10.1	10.7	8.9	7.4	7.7	8.6	9.5	8.3	8.2	8.8	8.3	9.0	9.0	8.9	7.6	7.4	8.8	8.5
10.2	12.2	11.0	10.1	12.0	11.8	11.7	12.0	9.3	8.3	7.5	8.9	10.9	11.1	10.1	10.6	13.3	14.0	13.2	13.5	11.2	10.8	10.1	10.4	10.7	10.4	10.8	12.2	11.5	13.2	11.7	11.4	9.3	10.0	11.4	9.8
13.6	13.1	10.8	10.2	11.4	13.8	16.1	16.9	16.1	14.0	12.9	18.7	15.1	13.4	13.4	13.2	14.3	16.5	17.3	15.3	14.7	13.9	15.7	18.4	17.8	17.2	17.8	18.4	18.3	17.2	16.5	14.9	14.3	14.6	14.5	15.1
13.9	14.1	12.8	9.8	9.2	10.3	14.3	16.9	17.6	17.6	17.5	19.8	19.5	15.5	14.3	13.0	12.5	18.2	17.0	15.5	16.0	17.2	20.1	23.0	19.4	19.6	20.0	20.7	18.9	19.1	16.6	16.9	16.0	16.7	17.2	14.1
9.2	12.0	13.1	11.9	9.6	12.7	17.3	21.2	18.6	17.3	16.9	19.3	16.5	8.4	8.9	8.7	10.8	15.1	17.5	15.2	11.2	12.6	17.6	19.4	11.8	11.1	15.7	18.7	16.0	15.7	14.4	11.8	11.3	9.8	10.0	9.5
13.7	14.7	15.7	16.0	15.5	17.4	14.3	12.3	9.5	10.3	11.8	13.0	8.1	7.5	11.4	9.3	12.3	18.0	21.2	15.7	11.3	11.2	12.7	7.5	3.4	10.9	9.8	9.2	15.4	5.6	9.8	10.2	12.9	14.5	13.8	12.6
19.3	18.3	19.9	19.6	20.9	22.7	22.6	20.4	16.8	17.0	21.2	20.0	15.8	13.7	13.5	17.5	21.1	24.8	25.7	23.5	21.8	20.3	17.9	11.0	14.2	18.9	19.6	21.0	18.6	17.2	13.1	15.9	20.2	20.4	20.4	18.1
15.9	14.1	11.5	9.2	7.7	8.4	6.8	5.5	5.6	6.0	19.6	22.6	22.4	21.6	18.4	15.5	9.6	10.0	17.2	23.2	21.4	15.2	13.2	18.9	19.9	22.1	22.1	21.7	22.1	18.3	17.7	21.7	22.5	18.7	18.5	19.0
20.0	18.1	20.7	14.0	10.5	5.2	4.6	5.7	5.8	4.4	12.1	18.2	19.1	15.4	12.4	6.3	4.2	2.9	3.4	15.3	13.6	9.9	12.2	19.2	18.8	18.0	18.9	14.7	12.9	15.9	10.4	8.8	10.4	13.0	16.9	17.4
15.5	13.9	20.0	20.4	19.1	18.1	17.3	11.7	9.7	7.0	5.9	14.2	20.0	17.8	15.3	13.5	12.6	9.5	5.3	13.9	11.9	8.9	16.1	16.8	17.3	11.6	10.5	11.5	15.1	17.4	15.8	13.5	12.9	12.1	12.5	15.0
18.0	14.6	14.5	17.3	17.6	18.0	18.1	16.1	13.8	11.5	10.4	16.2	19.8	17.7	17.3	17.2	18.8	17.1	13.6	13.6	16.7	15.0	14.0	14.9	14.2	11.4	12.6	13.0	14.5	15.3	14.4	13.3	15.3	15.5	13.2	14.8
13.2	13.6	13.4	13.4	13.9	14.2	14.5	15.4	14.7	13.2	13.8	13.6	13.0	12.8	13.3	14.1	13.6	13.2	13.6	14.3	14.7	15.2	15.0	13.6	12.3	12.3	13.0	13.8	13.6	13.7	14.1	12.1	11.7	12.2	13.1	12.0
10.7	11.1	11.7	12.1	11.5	11.7	11.6	12.0	13.0	12.0	12.5	12.8	11.5	10.9	10.5	9.6	9.2	9.3	9.4	10.9	11.2	12.2	11.9	12.2	12.1	11.4	11.0	11.2	12.1	12.5	12.4	12.4	11.6	11.3	11.4	10.8
8.5	8.5	8.4	9.4	10.0	10.2	10.1	10.2	10.0	10.6	11.0	12.0	11.2	9.8	7.9	7.1	7.3	8.5	8.6	9.0	9.8	10.6	11.3	11.5	11.1	9.5	9.2	9.8	8.6	10.6	11.4	11.4	10.1	9.2	8.5	9.1
5.6	5.4	7.1	9.0	10.4	10.9	10.6	11.4	12.4	11.3	12.9	12.2	10.2	8.9	7.6	8.4	9.2	7.3	7.3	7.7	8.7	7.2	5.3	3.3	4.3	4.8	3.7	3.9	4.1	4.0	3.9	2.9	3.5	4.7	8.5	6.1
8.6	9.1	10.0	8.8	8.0	8.1	9.9	10.4	10.0	7.8	7.2	7.8	8.0	7.0	6.5	5.4	4.8	4.7	4.6	4.0	3.6	3.7	3.8	3.6	3.4	3.6	3.8	3.4	3.7	3.5	3.5	3.8	5.4	8.0	9.9	8.9

Figure 43. ATOVS MEAN O-B brightness temperature differences (deg C). APRIL 2003
Channel: HIRS15 (700 hPa)
NOAA16, using all observations

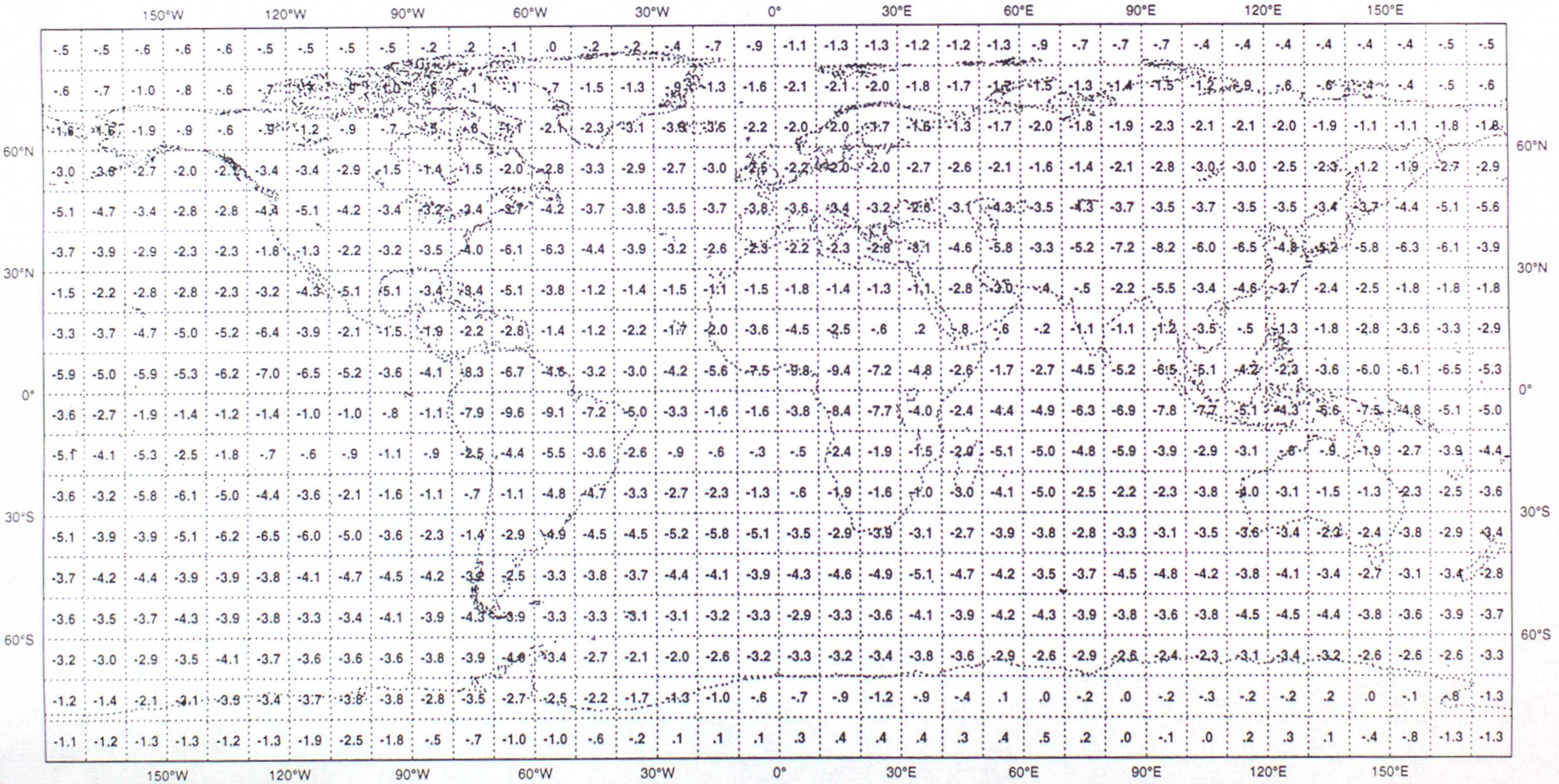
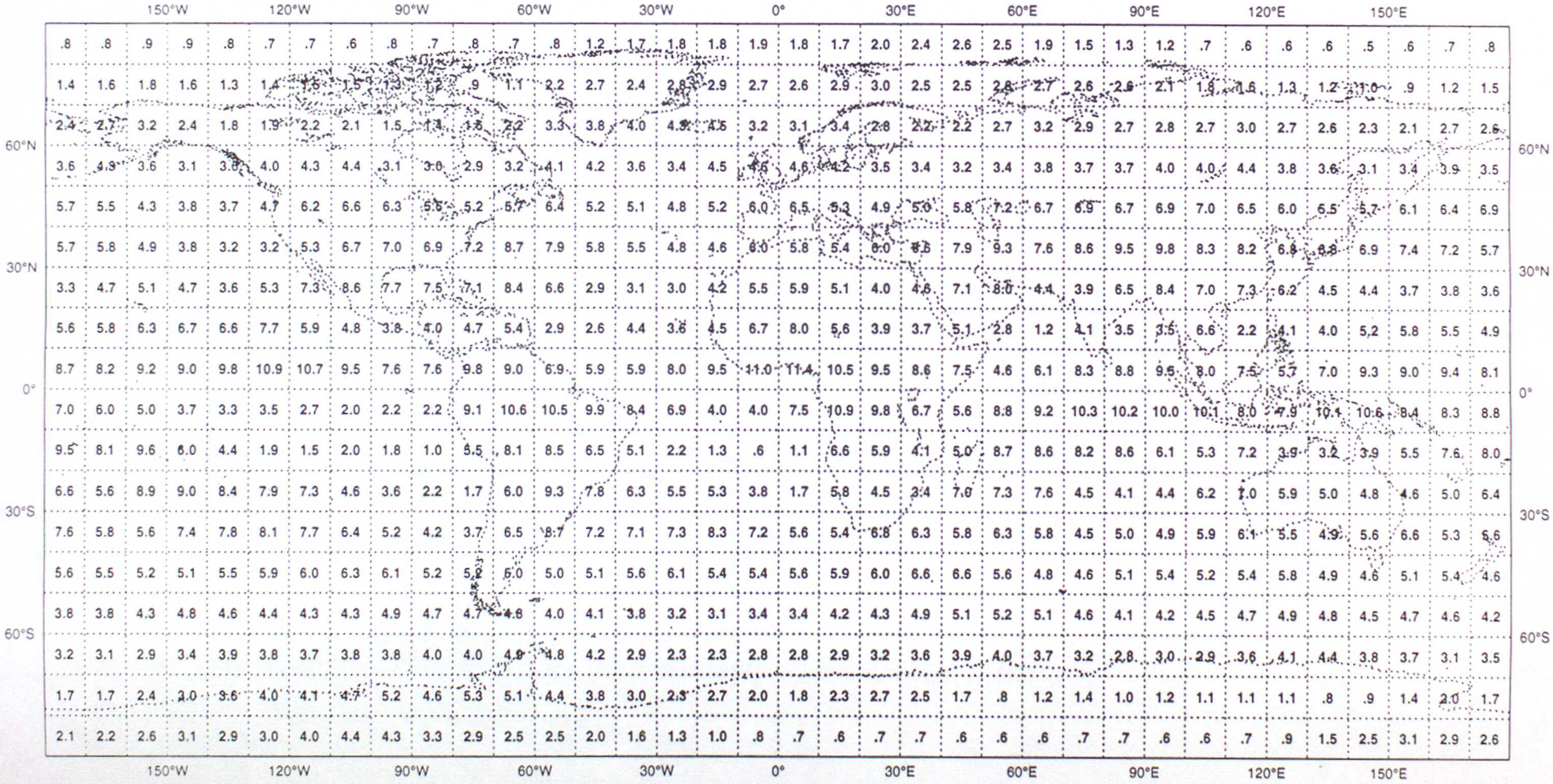
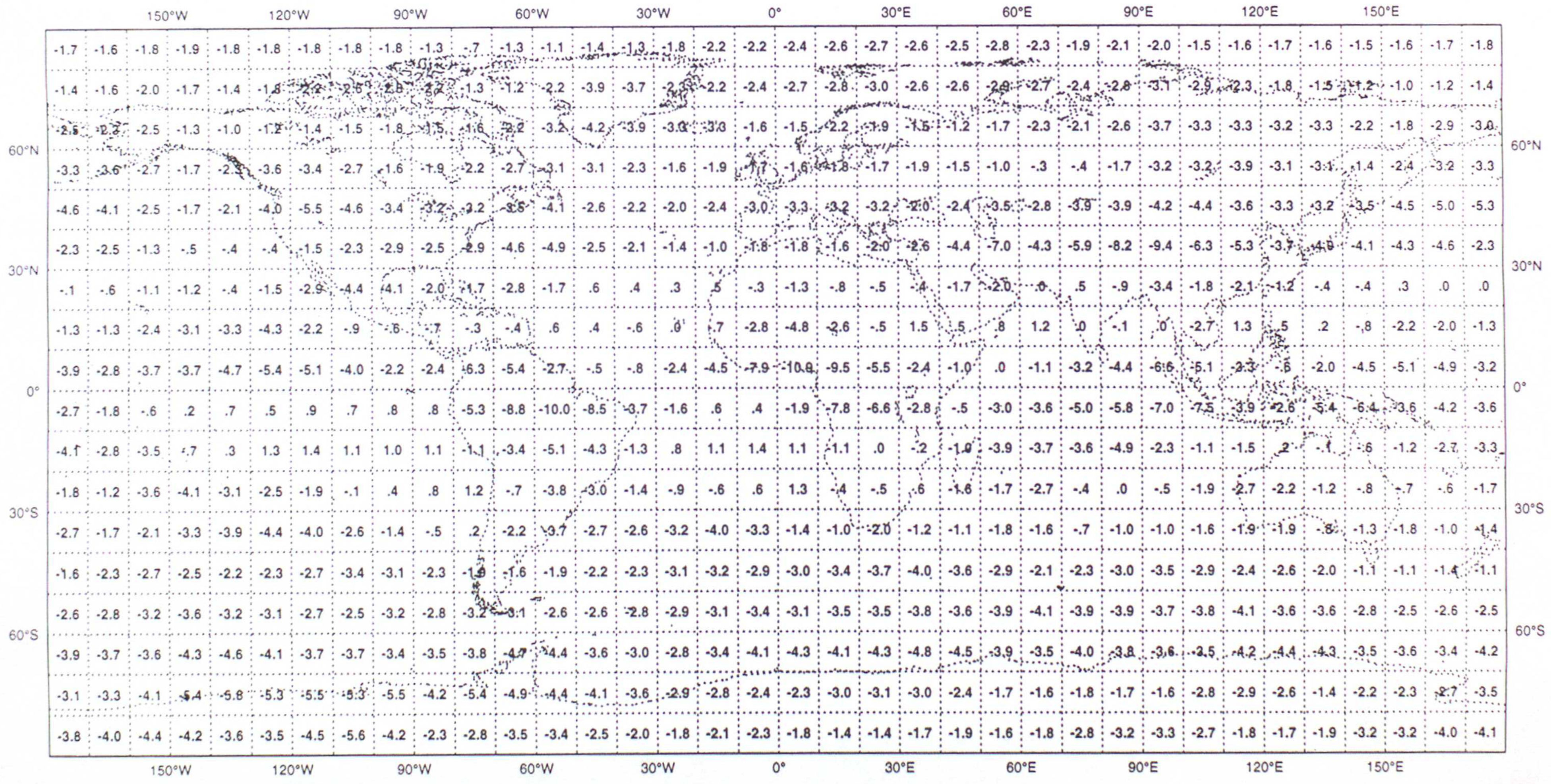

150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S
-.5 -.5 -.6 -.6 -.6 -.5 -.5 -.5 -.5 -.2 .2 -.1 .0 -.2 -.2 -.4 -.7 -.9 -1.1 -1.3 -1.3 -1.2 -1.2 -1.3 -.9 -.7 -.7 -.7 -.4 -.4 -.4 -.4 -.4 -.4 -.5 -.5
-.6 -.7 -1.0 -.8 -.6 -.7 -.7 -.9 -1.0 -.5 -.1 -.1 -.7 -1.5 -1.3 -.9 -1.3 -1.6 -2.1 -2.1 -2.0 -1.8 -1.7 -1.7 -1.5 -1.3 -1.4 -1.5 -1.2 -.9 -.6 -.6 -.4 -.4 -.5 -.6
-1.6 -1.6 -1.9 -.9 -.6 -.9 -1.2 -.9 -.7 -.5 -.6 -1.1 -2.1 -2.3 -3.1 -3.8 -3.5 -2.2 -2.0 -2.0 -1.7 -1.6 -1.3 -1.7 -2.0 -1.8 -1.9 -2.3 -2.1 -2.1 -2.0 -1.9 -1.1 -1.1 -1.8 -1.8
-3.0 -3.6 -2.7 -2.0 -2.2 -3.4 -3.4 -2.9 -1.5 -1.4 -1.5 -2.0 -2.8 -3.3 -2.9 -2.7 -3.0 -2.5 -2.2 -2.0 -2.0 -2.7 -2.6 -2.1 -1.6 -1.4 -2.1 -2.8 -3.0 -3.0 -2.5 -2.3 -1.2 -1.9 -2.7 -2.9
-5.1 -4.7 -3.4 -2.8 -2.8 -4.4 -5.1 -4.2 -3.4 -3.2 -3.4 -3.7 -4.2 -3.7 -3.8 -3.5 -3.7 -3.8 -3.6 -3.4 -3.2 -2.8 -3.1 -4.3 -3.5 -4.3 -3.7 -3.5 -3.7 -3.5 -3.5 -3.4 -3.7 -4.4 -5.1 -5.6
-3.7 -3.9 -2.9 -2.3 -2.3 -1.8 -1.3 -2.2 -3.2 -3.5 -4.0 -6.1 -6.3 -4.4 -3.9 -3.2 -2.6 -2.3 -2.2 -2.3 -2.8 -8.1 -4.6 -5.8 -3.3 -5.2 -7.2 -8.2 -6.0 -6.5 -4.8 -5.2 -5.8 -6.3 -6.1 -3.9
-1.5 -2.2 -2.8 -2.8 -2.3 -3.2 -4.3 -5.1 -5.1 -3.4 -8.4 -5.1 -3.8 -1.2 -1.4 -1.5 -1.1 -1.5 -1.8 -1.4 -1.3 -1.1 -2.8 -3.0 -.4 -.5 -2.2 -5.5 -3.4 -4.6 -3.7 -2.4 -2.5 -1.8 -1.8 -1.8
-3.3 -3.7 -4.7 -5.0 -5.2 -6.4 -3.9 -2.1 -1.5 -1.9 -2.2 -2.8 -1.4 -1.2 -2.2 -1.7 -2.0 -3.6 -4.5 -2.5 -.6 .2 -.8 -.6 -.2 -1.1 -1.1 -1.2 -3.5 -.5 -1.3 -1.8 -2.8 -3.6 -3.3 -2.9
-5.9 -5.0 -5.9 -5.3 -6.2 -7.0 -6.5 -5.2 -3.6 -4.1 -8.3 -6.7 -4.6 -3.2 -3.0 -4.2 -5.6 -7.5 -9.8 -9.4 -7.2 -4.8 -2.6 -1.7 -2.7 -4.5 -5.2 -6.5 -5.1 -4.2 -2.3 -3.6 -6.0 -6.1 -6.5 -5.3
-3.6 -2.7 -1.9 -1.4 -1.2 -1.4 -1.0 -1.0 -.8 -1.1 -7.9 -9.6 -9.1 -7.2 -5.0 -3.3 -1.6 -1.6 -3.8 -8.4 -7.7 -4.0 -2.4 -4.4 -4.9 -6.3 -6.9 -7.8 -7.7 -5.1 -4.3 -6.6 -7.5 -4.8 -5.1 -5.0
-5.1 -4.1 -5.3 -2.5 -1.8 -.7 -.6 -.9 -1.1 -.9 -2.5 -4.4 -5.5 -3.6 -2.6 -.9 -.6 -.3 -.5 -2.4 -1.9 -1.5 -2.0 -5.1 -5.0 -4.8 -5.9 -3.9 -2.9 -3.1 -.6 -.9 -1.9 -2.7 -3.9 -4.4
-3.6 -3.2 -5.8 -6.1 -5.0 -4.4 -3.6 -2.1 -1.6 -1.1 -.7 -1.1 -4.8 -4.7 -3.3 -2.7 -2.3 -1.3 -.6 -1.9 -1.6 -1.0 -3.0 -4.1 -5.0 -2.5 -2.2 -2.3 -3.8 -4.0 -3.1 -1.5 -1.3 -2.3 -2.5 -3.6
-5.1 -3.9 -3.9 -5.1 -6.2 -6.5 -6.0 -5.0 -3.6 -2.3 -1.4 -2.9 -4.9 -4.5 -4.5 -5.2 -5.8 -5.1 -3.5 -2.9 -3.9 -3.1 -2.7 -3.9 -3.8 -2.8 -3.3 -3.1 -3.5 -3.6 -3.4 -2.3 -2.4 -3.8 -2.9 -3.4
-3.7 -4.2 -4.4 -3.9 -3.9 -3.8 -4.1 -4.7 -4.5 -4.2 -3.2 -2.5 -3.3 -3.8 -3.7 -4.4 -4.1 -3.9 -4.3 -4.6 -4.9 -5.1 -4.7 -4.2 -3.5 -3.7 -4.5 -4.8 -4.2 -3.8 -4.1 -3.4 -2.7 -3.1 -3.4 -2.8
-3.6 -3.5 -3.7 -4.3 -3.9 -3.8 -3.3 -3.4 -4.1 -3.9 -4.3 -3.9 -3.3 -3.3 -3.1 -3.1 -3.2 -3.3 -2.9 -3.3 -3.6 -4.1 -3.9 -4.2 -4.3 -3.9 -3.8 -3.6 -3.8 -4.5 -4.5 -4.4 -3.8 -3.6 -3.9 -3.7
-3.2 -3.0 -2.9 -3.5 -4.1 -3.7 -3.6 -3.6 -3.6 -3.8 -3.9 -4.0 -3.4 -2.7 -2.1 -2.0 -2.6 -3.2 -3.3 -3.2 -3.4 -3.8 -3.6 -2.9 -2.6 -2.9 -2.6 -2.4 -2.3 -3.1 -3.4 -3.2 -2.6 -2.6 -2.6 -3.3
-1.2 -1.4 -2.1 -3.1 -3.9 -3.4 -3.7 -3.8 -3.8 -2.8 -3.5 -2.7 -2.5 -2.2 -1.7 -1.3 -1.0 -.6 -.7 -.9 -1.2 -.9 -.4 .1 .0 -.2 .0 -.2 -.3 -.2 -.2 .2 .0 -.1 -.8 -1.3
-1.1 -1.2 -1.3 -1.3 -1.2 -1.3 -1.9 -2.5 -1.8 -.5 -.7 -1.0 -1.0 -.6 -.2 .1 .1 .1 .3 .4 .4 .4 .3 .4 .5 .2 .0 -.1 .0 .2 .3 .1 -.4 -.8 -1.3 -1.3

Figure 44. ATOVS SD O-B brightness temperature differences (deg C). APRIL 2003
Channel: HIRS15 (700 hPa)
NOAA16, using all observations



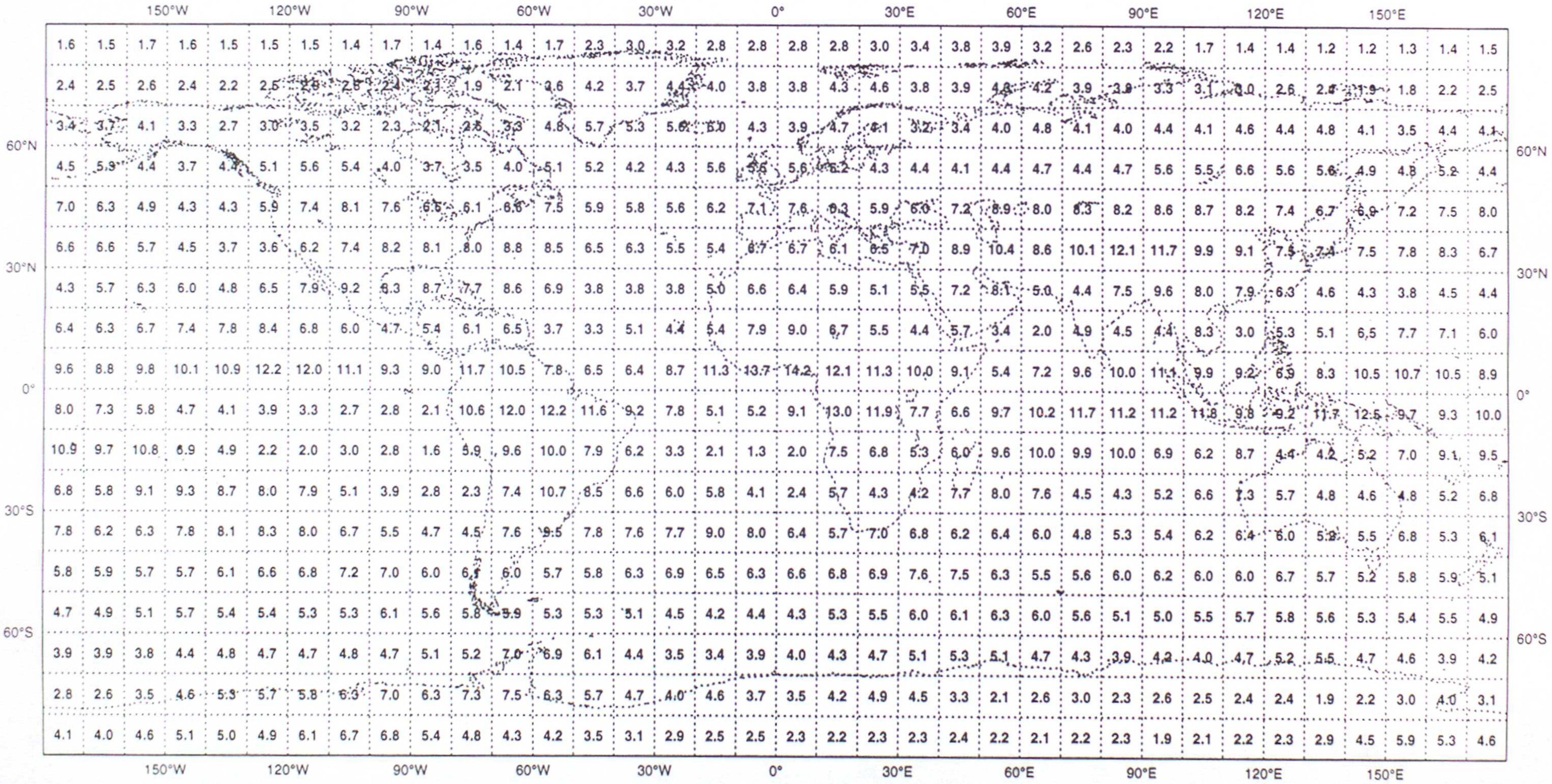
.8	.8	.9	.9	.8	.7	.7	.6	.8	.7	.8	.7	.8	1.2	1.7	1.8	1.8	1.9	1.8	1.7	2.0	2.4	2.6	2.5	1.9	1.5	1.3	1.2	.7	.6	.6	.6	.5	.6	.7	.8
1.4	1.6	1.8	1.6	1.3	1.4	1.6	1.5	1.3	1.2	.9	1.1	2.2	2.7	2.4	2.8	2.9	2.7	2.6	2.9	3.0	2.5	2.5	2.8	2.7	2.6	2.6	2.1	1.8	1.6	1.3	1.2	1.0	.9	1.2	1.5
2.4	2.7	3.2	2.4	1.8	1.9	2.2	2.1	1.5	1.4	1.6	2.2	3.3	3.8	4.0	4.3	4.5	3.2	3.1	3.4	2.8	2.2	2.2	2.7	3.2	2.9	2.7	2.8	2.7	3.0	2.7	2.6	2.3	2.1	2.7	2.6
3.6	4.9	3.6	3.1	3.8	4.0	4.3	4.4	3.1	3.0	2.9	3.2	4.1	4.2	3.6	3.4	4.5	4.6	4.6	4.2	3.5	3.4	3.2	3.4	3.8	3.7	3.7	4.0	4.0	4.4	3.8	3.6	3.1	3.4	3.9	3.5
5.7	5.5	4.3	3.8	3.7	4.7	6.2	6.6	6.3	5.6	5.2	5.7	6.4	5.2	5.1	4.8	5.2	6.0	6.5	5.3	4.9	5.0	5.8	7.2	6.7	6.9	6.7	6.9	7.0	6.5	6.0	6.5	5.7	6.1	6.4	6.9
5.7	5.8	4.9	3.8	3.2	3.2	5.3	6.7	7.0	6.9	7.2	8.7	7.9	5.8	5.5	4.8	4.6	6.0	5.8	5.4	6.0	8.5	7.9	9.3	7.6	8.6	9.5	9.8	8.3	8.2	6.8	6.8	6.9	7.4	7.2	5.7
3.3	4.7	5.1	4.7	3.6	5.3	7.3	8.6	7.7	7.5	7.1	8.4	6.6	2.9	3.1	3.0	4.2	5.5	5.9	5.1	4.0	4.6	7.1	8.0	4.4	3.9	6.5	8.4	7.0	7.3	6.2	4.5	4.4	3.7	3.8	3.6
5.6	5.8	6.3	6.7	6.6	7.7	5.9	4.8	3.8	4.0	4.7	5.4	2.9	2.6	4.4	3.6	4.5	6.7	8.0	5.6	3.9	3.7	5.1	2.8	1.2	4.1	3.5	3.5	6.6	2.2	4.1	4.0	5.2	5.8	5.5	4.9
8.7	8.2	9.2	9.0	9.8	10.9	10.7	9.5	7.6	7.6	9.8	9.0	6.9	5.9	5.9	8.0	9.5	11.0	11.4	10.5	9.5	8.6	7.5	4.6	6.1	8.3	8.8	9.5	8.0	7.5	5.7	7.0	9.3	9.0	9.4	8.1
7.0	6.0	5.0	3.7	3.3	3.5	2.7	2.0	2.2	2.2	9.1	10.6	10.5	9.9	8.4	6.9	4.0	4.0	7.5	10.9	9.8	6.7	5.6	8.8	9.2	10.3	10.2	10.0	10.1	8.0	7.9	10.1	10.6	8.4	8.3	8.8
9.5	8.1	9.6	6.0	4.4	1.9	1.5	2.0	1.8	1.0	5.5	8.1	8.5	6.5	5.1	2.2	1.3	.6	1.1	6.6	5.9	4.1	5.0	8.7	8.6	8.2	8.6	6.1	5.3	7.2	3.9	3.2	3.9	5.5	7.6	8.0
6.6	5.6	8.9	9.0	8.4	7.9	7.3	4.6	3.6	2.2	1.7	6.0	9.3	7.8	6.3	5.5	5.3	3.8	1.7	5.8	4.5	3.4	7.0	7.3	7.6	4.5	4.1	4.4	6.2	7.0	5.9	5.0	4.8	4.6	5.0	6.4
7.6	5.8	5.6	7.4	7.8	8.1	7.7	6.4	5.2	4.2	3.7	6.5	8.7	7.2	7.1	7.3	8.3	7.2	5.6	5.4	6.8	6.3	5.8	6.3	5.8	4.5	5.0	4.9	5.9	6.1	5.5	4.9	5.6	6.6	5.3	5.6
5.6	5.5	5.2	5.1	5.5	5.9	6.0	6.3	6.1	5.2	5.2	6.0	5.0	5.1	5.6	6.1	5.4	5.4	5.6	5.9	6.0	6.6	6.6	5.6	4.8	4.6	5.1	5.4	5.2	5.4	5.8	4.9	4.6	5.1	5.4	4.6
3.8	3.8	4.3	4.8	4.6	4.4	4.3	4.3	4.9	4.7	4.7	4.8	4.0	4.1	3.8	3.2	3.1	3.4	3.4	4.2	4.3	4.9	5.1	5.2	5.1	4.6	4.1	4.2	4.5	4.7	4.9	4.8	4.5	4.7	4.6	4.2
3.2	3.1	2.9	3.4	3.9	3.8	3.7	3.8	3.8	4.0	4.0	4.9	4.8	4.2	2.9	2.3	2.3	2.8	2.8	2.9	3.2	3.6	3.9	4.0	3.7	3.2	2.8	3.0	2.9	3.6	4.1	4.4	3.8	3.7	3.1	3.5
1.7	1.7	2.4	3.0	3.6	4.0	4.1	4.7	5.2	4.6	5.3	5.1	4.4	3.8	3.0	2.3	2.7	2.0	1.8	2.3	2.7	2.5	1.7	.8	1.2	1.4	1.0	1.2	1.1	1.1	1.1	.8	.9	1.4	2.0	1.7
2.1	2.2	2.6	3.1	2.9	3.0	4.0	4.4	4.3	3.3	2.9	2.5	2.5	2.0	1.6	1.3	1.0	.8	.7	.6	.7	.7	.6	.6	.6	.7	.7	.6	.6	.7	.9	1.5	2.5	3.1	2.9	2.6

Figure 45. ATOVS MEAN O-B brightness temperature differences (deg C). APRIL 2003
Channel: HIRS11 (500 - 700 hPa)
NOAA16, using all observations



-1.7	-1.6	-1.8	-1.9	-1.8	-1.8	-1.8	-1.8	-1.8	-1.3	-.7	-1.3	-1.1	-1.4	-1.3	-1.8	-2.2	-2.2	-2.4	-2.6	-2.7	-2.6	-2.5	-2.8	-2.3	-1.9	-2.1	-2.0	-1.5	-1.6	-1.7	-1.6	-1.5	-1.6	-1.7	-1.8
-1.4	-1.6	-2.0	-1.7	-1.4	-1.8	-2.2	-2.5	-2.8	-2.2	-1.3	-1.2	-2.2	-3.9	-3.7	-2.3	-2.2	-2.4	-2.7	-2.8	-3.0	-2.6	-2.6	-2.9	-2.7	-2.4	-2.8	-3.1	-2.9	-2.3	-1.8	-1.5	-1.2	-1.0	-1.2	-1.4
-2.5	-2.2	-2.5	-1.3	-1.0	-1.2	-1.4	-1.5	-1.8	-1.5	-1.6	-2.2	-3.2	-4.2	-3.9	-3.0	-3.3	-1.6	-1.5	-2.2	-1.9	-1.5	-1.2	-1.7	-2.3	-2.1	-2.6	-3.7	-3.3	-3.3	-3.2	-3.3	-2.2	-1.8	-2.9	-3.0
-3.3	-3.6	-2.7	-1.7	-2.3	-3.6	-3.4	-2.7	-1.6	-1.9	-2.2	-2.7	-3.1	-3.1	-2.3	-1.6	-1.9	-1.7	-1.6	-1.8	-1.7	-1.9	-1.5	-1.0	-.3	-.4	-1.7	-3.2	-3.2	-3.9	-3.1	-3.1	-1.4	-2.4	-3.2	-3.3
-4.6	-4.1	-2.5	-1.7	-2.1	-4.0	-5.5	-4.6	-3.4	-3.2	-3.2	-3.5	-4.1	-2.6	-2.2	-2.0	-2.4	-3.0	-3.3	-3.2	-3.2	-2.0	-2.4	-3.5	-2.8	-3.9	-3.9	-4.2	-4.4	-3.6	-3.3	-3.2	-3.5	-4.5	-5.0	-5.3
-2.3	-2.5	-1.3	-.5	-.4	-.4	-1.5	-2.3	-2.9	-2.5	-2.9	-4.6	-4.9	-2.5	-2.1	-1.4	-1.0	-1.8	-1.8	-1.6	-2.0	-2.6	-4.4	-7.0	-4.3	-5.9	-8.2	-9.4	-6.3	-5.3	-3.7	-4.0	-4.1	-4.3	-4.6	-2.3
-.1	-.6	-1.1	-1.2	-.4	-1.5	-2.9	-4.4	-4.1	-2.0	-1.7	-2.8	-1.7	.6	.4	.3	.5	-.3	-1.3	-.8	-.5	-.4	-1.7	-2.0	.0	.5	-.9	-3.4	-1.8	-2.1	-1.2	-.4	-.4	.3	.0	.0
-1.3	-1.3	-2.4	-3.1	-3.3	-4.3	-2.2	-.9	-.6	-.7	-.3	-.4	.6	.4	-.6	.0	.7	-2.8	-4.8	-2.6	-.5	1.5	.5	.8	1.2	.0	-.1	.0	-2.7	1.3	.5	.2	-.8	-2.2	-2.0	-1.3
-3.9	-2.8	-3.7	-3.7	-4.7	-5.4	-5.1	-4.0	-2.2	-2.4	-6.3	-5.4	-2.7	-.5	-.8	-2.4	-4.5	-7.9	-10.8	-9.5	-5.5	-2.4	-1.0	.0	-1.1	-3.2	-4.4	-6.6	-5.1	-2.3	-.6	-2.0	-4.5	-5.1	-4.9	-3.2
-2.7	-1.8	-.6	.2	.7	.5	.9	.7	.8	.8	-5.3	-8.8	-10.0	-8.5	-3.7	-1.6	.6	.4	-1.9	-7.8	-6.6	-2.8	-.5	-3.0	-3.6	-5.0	-5.8	-7.0	-7.5	-3.9	-2.6	-5.4	-6.4	-3.6	-4.2	-3.6
-4.1	-2.8	-3.5	-.7	.3	1.3	1.4	1.1	1.0	1.1	-1.1	-3.4	-5.1	-4.3	-1.3	.8	1.1	1.4	1.1	-1.1	.0	-.2	-1.0	-3.9	-3.7	-3.6	-4.9	-2.3	-1.1	-1.5	.2	-.1	-.6	-1.2	-2.7	-3.3
-1.8	-1.2	-3.6	-4.1	-3.1	-2.5	-1.9	-.1	.4	.8	1.2	-.7	-3.8	-3.0	-1.4	-.9	-.6	.6	1.3	-.4	-.5	.6	-1.6	-1.7	-2.7	-.4	.0	-.5	-1.9	-2.7	-2.2	-1.2	-.8	-.7	-.6	-1.7
-2.7	-1.7	-2.1	-3.3	-3.9	-4.4	-4.0	-2.6	-1.4	-.5	.2	-2.2	-3.7	-2.7	-2.6	-3.2	-4.0	-3.3	-1.4	-1.0	-2.0	-1.2	-1.1	-1.8	-1.6	-.7	-1.0	-1.0	-1.6	-1.9	-1.9	-.8	-1.3	-1.8	-1.0	-1.4
-1.6	-2.3	-2.7	-2.5	-2.2	-2.3	-2.7	-3.4	-3.1	-2.3	-1.9	-1.6	-1.9	-2.2	-2.3	-3.1	-3.2	-2.9	-3.0	-3.4	-3.7	-4.0	-3.6	-2.9	-2.1	-2.3	-3.0	-3.5	-2.9	-2.4	-2.6	-2.0	-1.1	-1.1	-1.4	-1.1
-2.6	-2.8	-3.2	-3.6	-3.2	-3.1	-2.7	-2.5	-3.2	-2.8	-3.2	-3.1	-2.6	-2.6	-2.8	-2.9	-3.1	-3.4	-3.1	-3.5	-3.5	-3.8	-3.6	-3.9	-4.1	-3.9	-3.9	-3.7	-3.8	-4.1	-3.6	-3.6	-2.8	-2.5	-2.6	-2.5
-3.9	-3.7	-3.6	-4.3	-4.6	-4.1	-3.7	-3.7	-3.4	-3.5	-3.8	-4.7	-4.4	-3.6	-3.0	-2.8	-3.4	-4.1	-4.3	-4.1	-4.3	-4.8	-4.5	-3.9	-3.5	-4.0	-3.8	-3.6	-3.5	-4.2	-4.4	-4.3	-3.5	-3.6	-3.4	-4.2
-3.1	-3.3	-4.1	-5.4	-5.8	-5.3	-5.5	-5.3	-5.5	-4.2	-5.4	-4.9	-4.4	-4.1	-3.6	-2.9	-2.8	-2.4	-2.3	-3.0	-3.1	-3.0	-2.4	-1.7	-1.6	-1.8	-1.7	-1.6	-2.8	-2.9	-2.6	-1.4	-2.2	-2.3	-2.7	-3.5
-3.8	-4.0	-4.4	-4.2	-3.6	-3.5	-4.5	-5.6	-4.2	-2.3	-2.8	-3.5	-3.4	-2.5	-2.0	-1.8	-2.1	-2.3	-1.8	-1.4	-1.4	-1.7	-1.9	-1.6	-1.8	-2.8	-3.2	-3.3	-2.7	-1.8	-1.7	-1.9	-3.2	-3.2	-4.0	-4.1

Figure 46. ATOVS SD O-B brightness temperature differences (deg C). APRIL 2003
Channel: HIRS11 (500 - 700 hPa)
NOAA16, using all observations



1.6	1.5	1.7	1.6	1.5	1.5	1.5	1.4	1.7	1.4	1.6	1.4	1.7	2.3	3.0	3.2	2.8	2.8	2.8	2.8	3.0	3.4	3.8	3.9	3.2	2.6	2.3	2.2	1.7	1.4	1.4	1.2	1.2	1.3	1.4	1.5
2.4	2.5	2.6	2.4	2.2	2.5	2.8	2.8	2.4	2.1	1.9	2.1	3.6	4.2	3.7	4.4	4.0	3.8	3.8	4.3	4.6	3.8	3.9	4.8	4.2	3.9	3.9	3.3	3.1	3.0	2.6	2.4	1.9	1.8	2.2	2.5
3.4	3.7	4.1	3.3	2.7	3.0	3.5	3.2	2.3	2.1	2.5	3.3	4.8	5.7	5.3	5.6	5.0	4.3	3.9	4.7	4.1	3.2	3.4	4.0	4.8	4.1	4.0	4.4	4.1	4.6	4.4	4.8	4.1	3.5	4.4	4.1
4.5	5.9	4.4	3.7	4.4	5.1	5.6	5.4	4.0	3.7	3.5	4.0	5.1	5.2	4.2	4.3	5.6	5.6	5.6	6.2	4.3	4.4	4.1	4.4	4.7	4.4	4.7	5.6	5.5	6.6	5.6	5.6	4.9	4.8	5.2	4.4
7.0	6.3	4.9	4.3	4.3	5.9	7.4	8.1	7.6	6.5	6.1	6.6	7.5	5.9	5.8	5.6	6.2	7.1	7.6	6.3	5.9	6.0	7.2	8.9	8.0	8.3	8.2	8.6	8.7	8.2	7.4	6.7	6.9	7.2	7.5	8.0
6.6	6.6	5.7	4.5	3.7	3.6	6.2	7.4	8.2	8.1	8.0	8.8	8.5	6.5	6.3	5.5	5.4	6.7	6.7	6.1	6.5	7.0	8.9	10.4	8.6	10.1	12.1	11.7	9.9	9.1	7.5	7.4	7.5	7.8	8.3	6.7
4.3	5.7	6.3	6.0	4.8	6.5	7.9	9.2	8.3	8.7	7.7	8.6	6.9	3.8	3.8	3.8	5.0	6.6	6.4	5.9	5.1	5.5	7.2	8.1	5.0	4.4	7.5	9.6	8.0	7.9	6.3	4.6	4.3	3.8	4.5	4.4
6.4	6.3	6.7	7.4	7.8	8.4	6.8	6.0	4.7	5.4	6.1	6.5	3.7	3.3	5.1	4.4	5.4	7.9	9.0	6.7	5.5	4.4	5.7	3.4	2.0	4.9	4.5	4.4	8.3	3.0	5.3	5.1	6.5	7.7	7.1	6.0
9.6	8.8	9.8	10.1	10.9	12.2	12.0	11.1	9.3	9.0	11.7	10.5	7.8	6.5	6.4	8.7	11.3	13.7	14.2	12.1	11.3	10.0	9.1	5.4	7.2	9.6	10.0	11.1	9.9	9.2	6.9	8.3	10.5	10.7	10.5	8.9
8.0	7.3	5.8	4.7	4.1	3.9	3.3	2.7	2.8	2.1	10.6	12.0	12.2	11.6	9.2	7.8	5.1	5.2	9.1	13.0	11.9	7.7	6.6	9.7	10.2	11.7	11.2	11.2	11.8	9.8	9.2	11.7	12.5	9.7	9.3	10.0
10.9	9.7	10.8	6.9	4.9	2.2	2.0	3.0	2.8	1.6	5.9	9.6	10.0	7.9	6.2	3.3	2.1	1.3	2.0	7.5	6.8	5.3	6.0	9.6	10.0	9.9	10.0	6.9	6.2	8.7	4.4	4.2	5.2	7.0	9.1	9.5
6.8	5.8	9.1	9.3	8.7	8.0	7.9	5.1	3.9	2.8	2.3	7.4	10.7	8.5	6.6	6.0	5.8	4.1	2.4	5.7	4.3	4.2	7.7	8.0	7.6	4.5	4.3	5.2	6.6	7.3	5.7	4.8	4.6	4.8	5.2	6.8
7.8	6.2	6.3	7.8	8.1	8.3	8.0	6.7	5.5	4.7	4.5	7.6	9.5	7.8	7.6	7.7	9.0	8.0	6.4	5.7	7.0	6.8	6.2	6.4	6.0	4.8	5.3	5.4	6.2	6.4	6.0	5.9	5.5	6.8	5.3	6.1
5.8	5.9	5.7	5.7	6.1	6.6	6.8	7.2	7.0	6.0	6.1	6.0	5.7	5.8	6.3	6.9	6.5	6.3	6.6	6.8	6.9	7.6	7.5	6.3	5.5	5.6	6.0	6.2	6.0	6.0	6.7	5.7	5.2	5.8	5.9	5.1
4.7	4.9	5.1	5.7	5.4	5.4	5.3	5.3	6.1	5.6	5.8	5.9	5.3	5.3	5.1	4.5	4.2	4.4	4.3	5.3	5.5	6.0	6.1	6.3	6.0	5.6	5.1	5.0	5.5	5.7	5.8	5.6	5.3	5.4	5.5	4.9
3.9	3.9	3.8	4.4	4.8	4.7	4.7	4.8	4.7	5.1	5.2	7.0	6.9	6.1	4.4	3.5	3.4	3.9	4.0	4.3	4.7	5.1	5.3	5.1	4.7	4.3	3.9	4.2	4.0	4.7	5.2	5.5	4.7	4.6	3.9	4.2
2.8	2.6	3.5	4.6	5.3	5.7	5.8	6.3	7.0	6.3	7.3	7.5	6.3	5.7	4.7	4.0	4.6	3.7	3.5	4.2	4.9	4.5	3.3	2.1	2.6	3.0	2.3	2.6	2.5	2.4	2.4	1.9	2.2	3.0	4.0	3.1
4.1	4.0	4.6	5.1	5.0	4.9	6.1	6.7	6.8	5.4	4.8	4.3	4.2	3.5	3.1	2.9	2.5	2.5	2.3	2.2	2.3	2.3	2.4	2.2	2.1	2.2	2.3	1.9	2.1	2.2	2.3	2.9	4.5	5.9	5.3	4.6

Figure 47. ATOVS MEAN O-B brightness temperature differences (deg C). APRIL 2003
Channel: HIRS4 (400 hPa)
NOAA16, using all observations

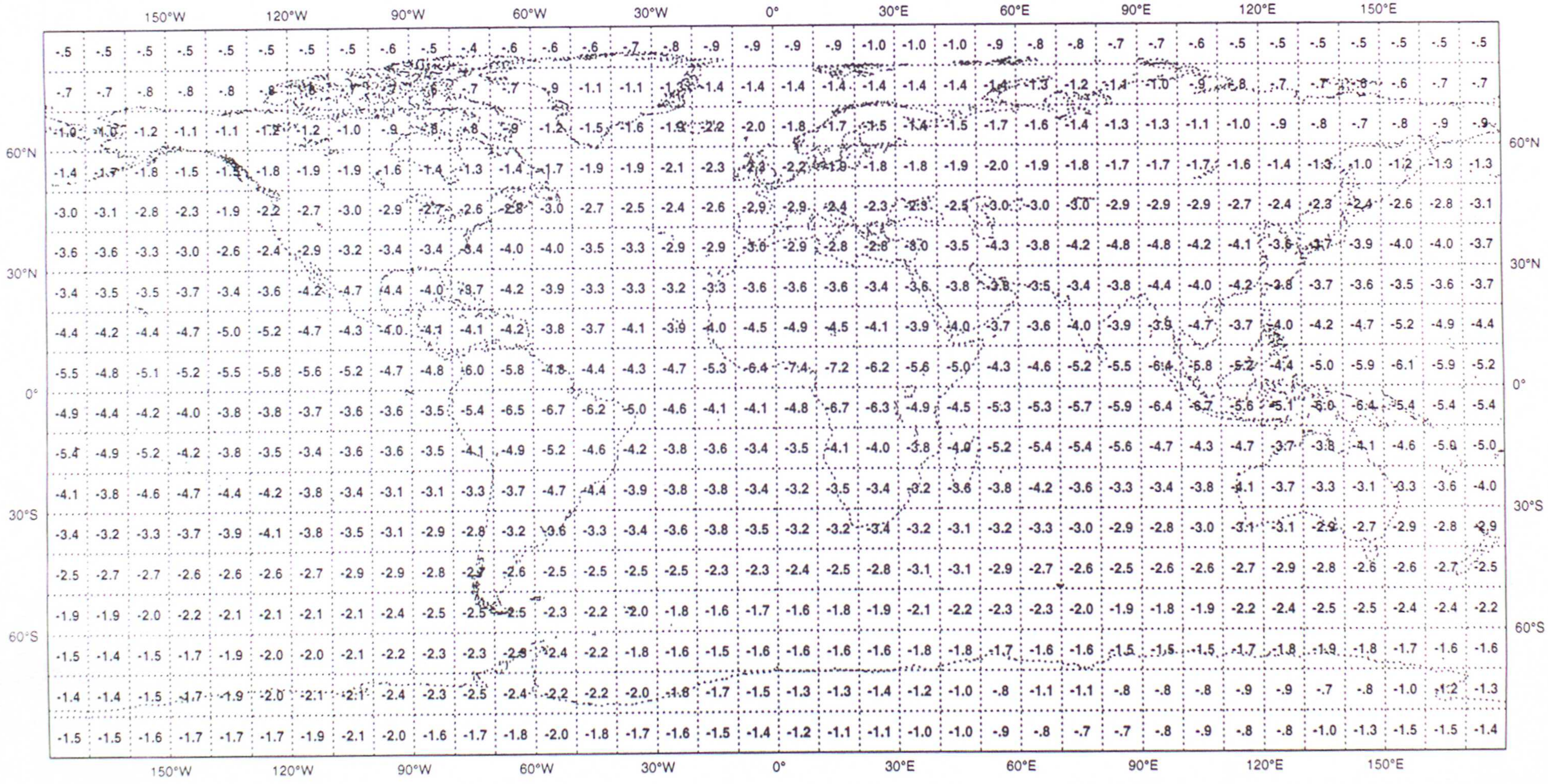

150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S
-.5 -.5 -.5 -.5 -.5 -.5 -.5 -.5 -.6 -.5 -.4 -.6 -.6 -.6 -.7 -.8 -.9 -.9 -.9 -.9 -1.0 -1.0 -1.0 -.9 -.8 -.8 -.7 -.7 -.6 -.5 -.5 -.5 -.5 -.5 -.5 -.5
-.7 -.7 -.8 -.8 -.8 -.8 -.8 -.7 -.7 -.6 -.7 -.7 -.9 -1.1 -1.1 -1.3 -1.4 -1.4 -1.4 -1.4 -1.4 -1.4 -1.4 -1.4 -1.3 -1.2 -1.4 -1.0 -.9 -.8 -.7 -.7 -.8 -.6 -.7 -.7
-1.0 -1.0 -1.2 -1.1 -1.1 -1.2 -1.2 -1.0 -.9 -.8 -.8 -.9 -1.2 -1.5 -1.6 -1.9 -2.2 -2.0 -1.8 -1.7 -1.5 -1.4 -1.5 -1.7 -1.6 -1.4 -1.3 -1.3 -1.1 -1.0 -.9 -.8 -.7 -.8 -.9 -.9
-1.4 -1.7 -1.8 -1.5 -1.5 -1.8 -1.9 -1.9 -1.6 -1.4 -1.3 -1.4 -1.7 -1.9 -1.9 -2.1 -2.3 -2.3 -2.2 -1.9 -1.8 -1.8 -1.9 -2.0 -1.9 -1.8 -1.7 -1.7 -1.7 -1.6 -1.4 -1.3 -1.0 -1.2 -1.3 -1.3
-3.0 -3.1 -2.8 -2.3 -1.9 -2.2 -2.7 -3.0 -2.9 -2.7 -2.6 -2.8 -3.0 -2.7 -2.5 -2.4 -2.6 -2.9 -2.9 -2.4 -2.3 -2.3 -2.5 -3.0 -3.0 -3.0 -2.9 -2.9 -2.9 -2.7 -2.4 -2.3 -2.4 -2.6 -2.8 -3.1
-3.6 -3.6 -3.3 -3.0 -2.6 -2.4 -2.9 -3.2 -3.4 -3.4 -3.4 -4.0 -4.0 -3.5 -3.3 -2.9 -2.9 -3.0 -2.9 -2.8 -2.8 -3.0 -3.5 -4.3 -3.8 -4.2 -4.8 -4.8 -4.2 -4.1 -3.6 -3.7 -3.9 -4.0 -4.0 -3.7
-3.4 -3.5 -3.5 -3.7 -3.4 -3.6 -4.2 -4.7 -4.4 -4.0 -3.7 -4.2 -3.9 -3.3 -3.3 -3.2 -3.3 -3.6 -3.6 -3.6 -3.4 -3.6 -3.8 -3.8 -3.5 -3.4 -3.8 -4.4 -4.0 -4.2 -3.8 -3.7 -3.6 -3.5 -3.6 -3.7
-4.4 -4.2 -4.4 -4.7 -5.0 -5.2 -4.7 -4.3 -4.0 -4.1 -4.1 -4.2 -3.8 -3.7 -4.1 -3.9 -4.0 -4.5 -4.9 -4.5 -4.1 -3.9 -4.0 -3.7 -3.6 -4.0 -3.9 -3.9 -4.7 -3.7 -4.0 -4.2 -4.7 -5.2 -4.9 -4.4
-5.5 -4.8 -5.1 -5.2 -5.5 -5.8 -5.6 -5.2 -4.7 -4.8 -6.0 -5.8 -4.8 -4.4 -4.3 -4.7 -5.3 -6.4 -7.4 -7.2 -6.2 -5.6 -5.0 -4.3 -4.6 -5.2 -5.5 -6.4 -5.8 -5.2 -4.4 -5.0 -5.9 -6.1 -5.9 -5.2
-4.9 -4.4 -4.2 -4.0 -3.8 -3.8 -3.7 -3.6 -3.6 -3.5 -5.4 -6.5 -6.7 -6.2 -5.0 -4.6 -4.1 -4.1 -4.8 -6.7 -6.3 -4.9 -4.5 -5.3 -5.3 -5.7 -5.9 -6.4 -6.7 -5.6 -5.1 -5.0 -6.4 -5.4 -5.4 -5.4
-5.4 -4.9 -5.2 -4.2 -3.8 -3.5 -3.4 -3.6 -3.6 -3.5 -4.1 -4.9 -5.2 -4.6 -4.2 -3.8 -3.6 -3.4 -3.5 -4.1 -4.0 -3.8 -4.0 -5.2 -5.4 -5.4 -5.6 -4.7 -4.3 -4.7 -3.7 -3.8 -4.1 -4.6 -5.0 -5.0
-4.1 -3.8 -4.6 -4.7 -4.4 -4.2 -3.8 -3.4 -3.1 -3.1 -3.3 -3.7 -4.7 -4.4 -3.9 -3.8 -3.8 -3.4 -3.2 -3.5 -3.4 -3.2 -3.6 -3.8 -4.2 -3.6 -3.3 -3.4 -3.8 -4.1 -3.7 -3.3 -3.1 -3.3 -3.6 -4.0
-3.4 -3.2 -3.3 -3.7 -3.9 -4.1 -3.8 -3.5 -3.1 -2.9 -2.8 -3.2 -3.6 -3.3 -3.4 -3.6 -3.8 -3.5 -3.2 -3.2 -3.4 -3.2 -3.1 -3.2 -3.3 -3.0 -2.9 -2.8 -3.0 -3.1 -3.1 -2.9 -2.7 -2.9 -2.8 -2.9
-2.5 -2.7 -2.7 -2.6 -2.6 -2.6 -2.7 -2.9 -2.9 -2.8 -2.7 -2.6 -2.5 -2.5 -2.5 -2.5 -2.3 -2.3 -2.4 -2.5 -2.8 -3.1 -3.1 -2.9 -2.7 -2.6 -2.5 -2.6 -2.6 -2.7 -2.9 -2.8 -2.6 -2.6 -2.7 -2.5
-1.9 -1.9 -2.0 -2.2 -2.1 -2.1 -2.1 -2.1 -2.4 -2.5 -2.5 -2.5 -2.3 -2.2 -2.0 -1.8 -1.6 -1.7 -1.6 -1.8 -1.9 -2.1 -2.2 -2.3 -2.3 -2.0 -1.9 -1.8 -1.9 -2.2 -2.4 -2.5 -2.5 -2.4 -2.4 -2.2
-1.5 -1.4 -1.5 -1.7 -1.9 -2.0 -2.0 -2.1 -2.2 -2.3 -2.3 -2.3 -2.4 -2.2 -1.8 -1.6 -1.5 -1.6 -1.6 -1.6 -1.6 -1.8 -1.8 -1.7 -1.6 -1.6 -1.5 -1.5 -1.5 -1.7 -1.8 -1.9 -1.8 -1.7 -1.6 -1.6
-1.4 -1.4 -1.5 -1.7 -1.9 -2.0 -2.1 -2.1 -2.4 -2.3 -2.5 -2.4 -2.2 -2.2 -2.0 -1.8 -1.7 -1.5 -1.3 -1.3 -1.4 -1.2 -1.0 -.8 -1.1 -1.1 -.8 -.8 -.8 -.9 -.9 -.7 -.8 -1.0 -1.2 -1.3
-1.5 -1.5 -1.6 -1.7 -1.7 -1.7 -1.9 -2.1 -2.0 -1.6 -1.7 -1.8 -2.0 -1.8 -1.7 -1.6 -1.5 -1.4 -1.2 -1.1 -1.1 -1.0 -1.0 -.9 -.8 -.7 -.7 -.8 -.9 -.8 -.8 -1.0 -1.3 -1.5 -1.5 -1.4

Figure 48. ATOVS SD O-B brightness temperature differences (deg C). APRIL 2003
Channel: HIRS4 (400 hPa)
NOAA16, using all observations

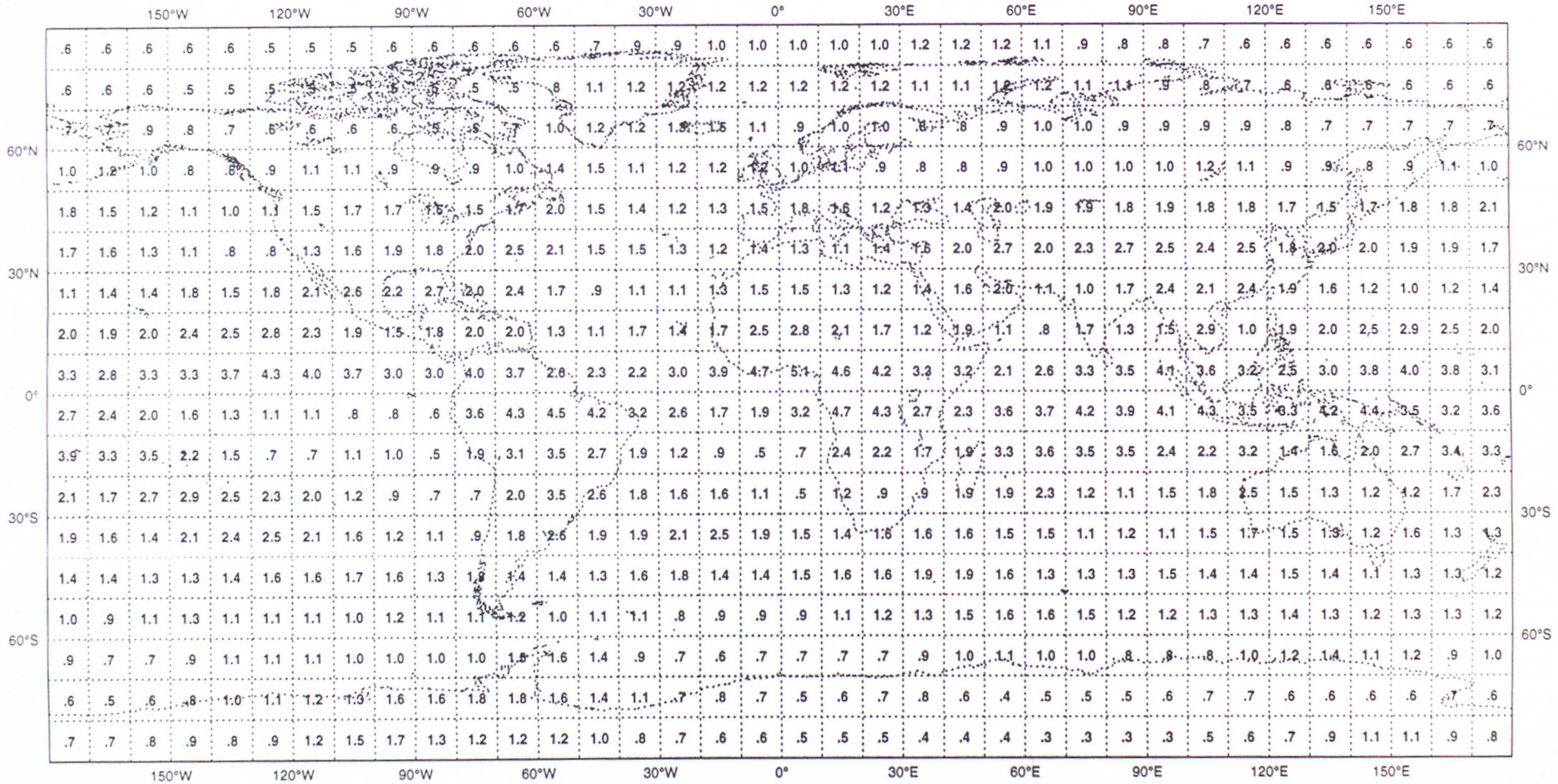
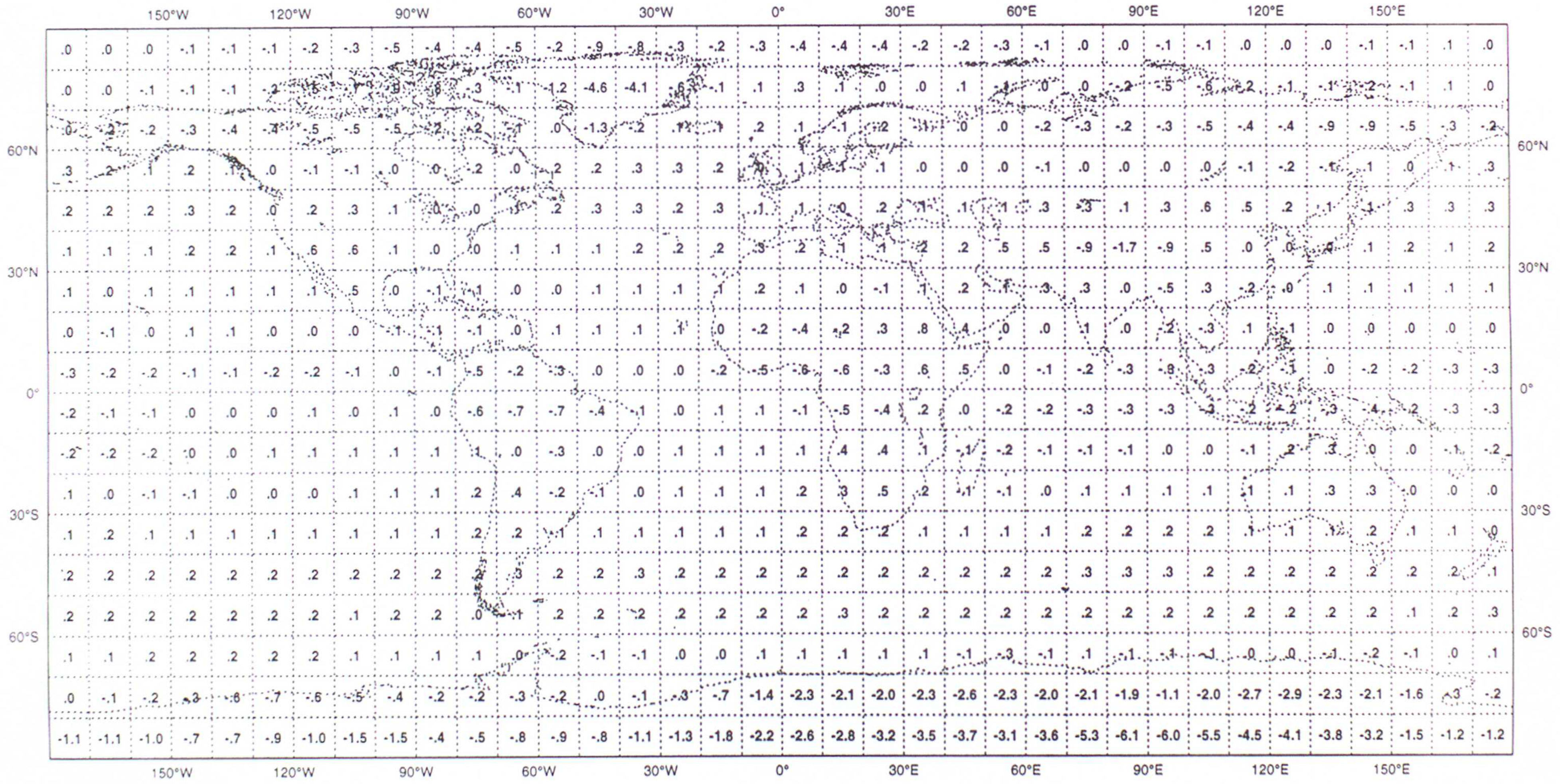
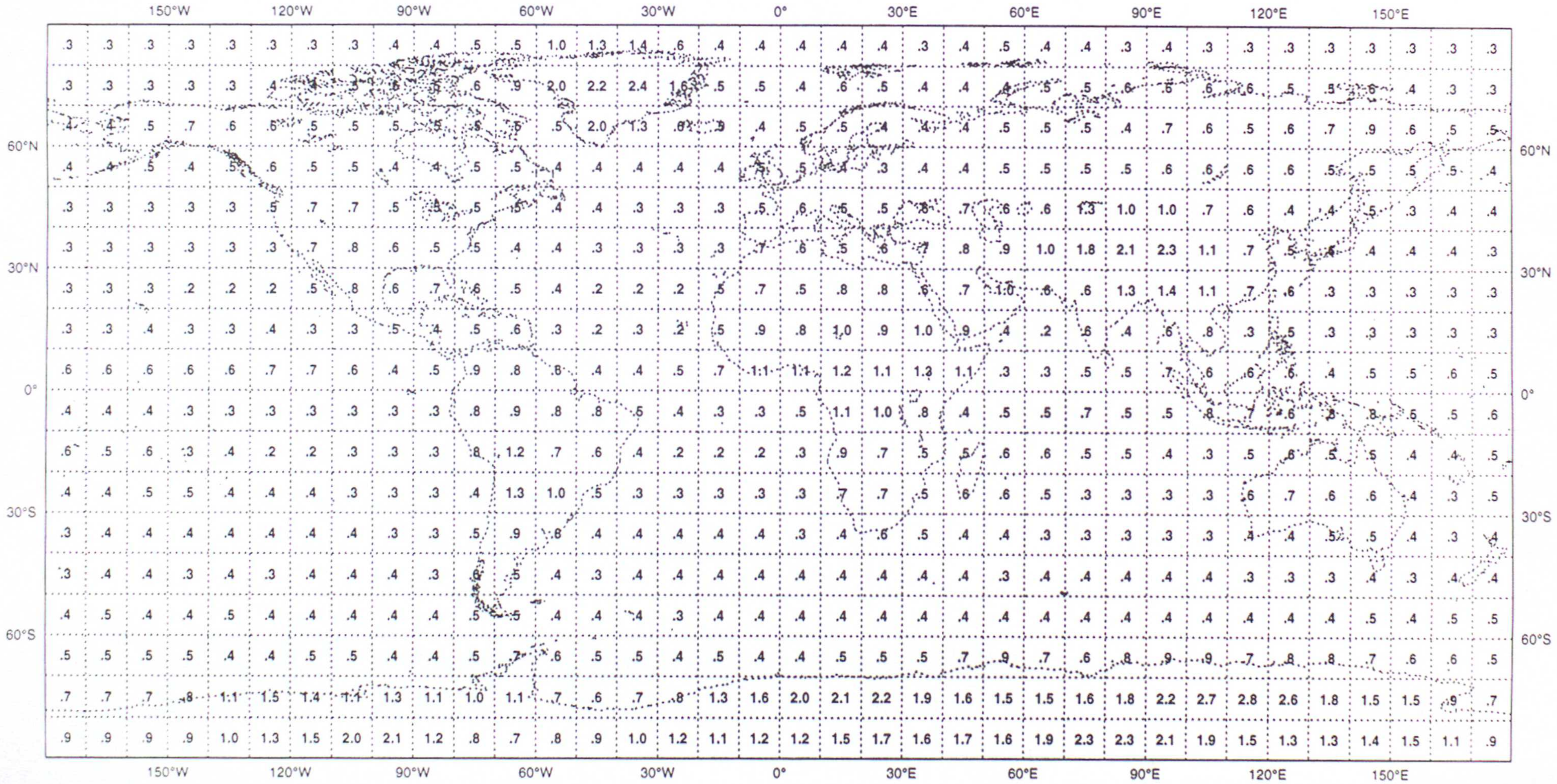

150°W 120°W 90°W 60°W 30°W 0° 30°E 60°E 90°E 120°E 150°E
60°N 30°N 0° 30°S 60°S
.6 .6 .6 .6 .6 .5 .5 .5 .6 .6 .6 .6 .6 .7 .9 .9 1.0 1.0 1.0 1.0 1.0 1.2 1.2 1.2 1.1 .9 .8 .8 .7 .6 .6 .6 .6 .6 .6 .6
.6 .6 .6 .5 .5 .5 .5 .5 .5 .5 .5 .5 .8 1.1 1.2 1.2 1.2 1.2 1.2 1.2 1.2 1.1 1.1 1.2 1.2 1.1 1.1 .9 .8 .7 .6 .6 .6 .6 .6 .6
.7 .7 .9 .8 .7 .6 .6 .6 .6 .5 .5 .7 1.0 1.2 1.2 1.8 1.5 1.1 .9 1.0 1.0 .8 .8 .9 1.0 1.0 .9 .9 .9 .9 .8 .7 .7 .7 .7 .7
1.0 1.2 1.0 .8 .8 .9 1.1 1.1 .9 .9 .9 1.0 1.4 1.5 1.1 1.2 1.2 1.2 1.0 1.1 .9 .8 .8 .9 1.0 1.0 1.0 1.0 1.2 1.1 .9 .9 .8 .9 1.1 1.0
1.8 1.5 1.2 1.1 1.0 1.1 1.5 1.7 1.7 1.6 1.5 1.7 2.0 1.5 1.4 1.2 1.3 1.5 1.8 1.6 1.2 1.3 1.4 2.0 1.9 1.9 1.8 1.9 1.8 1.8 1.7 1.5 1.7 1.8 1.8 2.1
1.7 1.6 1.3 1.1 .8 .8 1.3 1.6 1.9 1.8 2.0 2.5 2.1 1.5 1.5 1.3 1.2 1.4 1.3 1.1 1.4 1.6 2.0 2.7 2.0 2.3 2.7 2.5 2.4 2.5 1.8 2.0 2.0 1.9 1.9 1.7
1.1 1.4 1.4 1.8 1.5 1.8 2.1 2.6 2.2 2.7 2.0 2.4 1.7 .9 1.1 1.1 1.3 1.5 1.5 1.3 1.2 1.4 1.6 2.0 1.1 1.0 1.7 2.4 2.1 2.4 1.9 1.6 1.2 1.0 1.2 1.4
2.0 1.9 2.0 2.4 2.5 2.8 2.3 1.9 1.5 1.8 2.0 2.0 1.3 1.1 1.7 1.4 1.7 2.5 2.8 2.1 1.7 1.2 1.9 1.1 .8 1.7 1.3 1.5 2.9 1.0 1.9 2.0 2.5 2.9 2.5 2.0
3.3 2.8 3.3 3.3 3.7 4.3 4.0 3.7 3.0 3.0 4.0 3.7 2.8 2.3 2.2 3.0 3.9 4.7 5.1 4.6 4.2 3.3 3.2 2.1 2.6 3.3 3.5 4.1 3.6 3.2 2.5 3.0 3.8 4.0 3.8 3.1
2.7 2.4 2.0 1.6 1.3 1.1 1.1 .8 .8 .6 3.6 4.3 4.5 4.2 3.2 2.6 1.7 1.9 3.2 4.7 4.3 2.7 2.3 3.6 3.7 4.2 3.9 4.1 4.3 3.5 6.3 4.2 4.4 3.5 3.2 3.6
3.9 3.3 3.5 2.2 1.5 .7 .7 1.1 1.0 .5 1.9 3.1 3.5 2.7 1.9 1.2 .9 .5 .7 2.4 2.2 1.7 1.9 3.3 3.6 3.5 3.5 2.4 2.2 3.2 1.4 1.6 2.0 2.7 3.4 3.3
2.1 1.7 2.7 2.9 2.5 2.3 2.0 1.2 .9 .7 .7 2.0 3.5 2.6 1.8 1.6 1.6 1.1 .5 1.2 .9 .9 1.9 1.9 2.3 1.2 1.1 1.5 1.8 2.5 1.5 1.3 1.2 1.2 1.7 2.3
1.9 1.6 1.4 2.1 2.4 2.5 2.1 1.6 1.2 1.1 .9 1.8 2.6 1.9 1.9 2.1 2.5 1.9 1.5 1.4 1.6 1.6 1.6 1.5 1.5 1.1 1.2 1.1 1.5 1.7 1.5 1.3 1.2 1.6 1.3 1.3
1.4 1.4 1.3 1.3 1.4 1.6 1.6 1.7 1.6 1.3 1.8 1.4 1.4 1.3 1.6 1.8 1.4 1.4 1.5 1.6 1.6 1.9 1.9 1.6 1.3 1.3 1.3 1.5 1.4 1.4 1.5 1.4 1.1 1.3 1.3 1.2
1.0 .9 1.1 1.3 1.1 1.1 1.1 1.0 1.2 1.1 1.1 1.2 1.0 1.1 1.1 .8 .9 .9 .9 1.1 1.2 1.3 1.5 1.6 1.6 1.5 1.2 1.2 1.3 1.3 1.4 1.3 1.2 1.3 1.3 1.2
.9 .7 .7 .9 1.1 1.1 1.1 1.0 1.0 1.0 1.0 1.5 1.6 1.4 .9 .7 .6 .7 .7 .7 .7 .9 1.0 1.1 1.0 1.0 .8 .8 .8 1.0 1.2 1.4 1.1 1.2 .9 1.0
.6 .5 .6 .8 1.0 1.1 1.2 1.3 1.6 1.6 1.8 1.8 1.6 1.4 1.1 .7 .8 .7 .5 .6 .7 .8 .6 .4 .5 .5 .5 .6 .7 .7 .6 .6 .6 .6 .7 .6
.7 .7 .8 .9 .8 .9 1.2 1.5 1.7 1.3 1.2 1.2 1.2 1.0 .8 .7 .6 .6 .5 .5 .5 .4 .4 .4 .3 .3 .3 .3 .5 .6 .7 .9 1.1 1.1 .9 .8

Figure 49. ATOVS MEAN O-B brightness temperature differences (deg C). APRIL 2003
Channel: AMSUA-5 (700 hPa)
NOAA16, using all observations



.0	.0	.0	-.1	-.1	-.1	-.2	-.3	-.5	-.4	-.4	-.5	-.2	-.9	-.8	-.3	-.2	-.3	-.4	-.4	-.4	-.2	-.2	-.3	-.1	.0	.0	-.1	-.1	.0	.0	.0	-.1	-.1	.1	.0
.0	.0	-.1	-.1	-.1	-.2	-.5	-.7	-.9	-.8	-.3	-.1	-1.2	-4.6	-4.1	-.6	-.1	.1	.3	.1	.0	.0	.1	-.1	.0	.0	-.2	-.5	-.6	-.2	-.1	-.1	-.2	-.1	.1	.0
.0	-.2	-.2	-.3	-.4	-.4	-.5	-.5	-.5	-.2	-.2	-.1	.0	-1.3	-.2	.1	.1	.2	.1	-.1	-.2	-.1	.0	.0	-.2	-.3	-.2	-.3	-.5	-.4	-.4	-.9	-.9	-.5	-.3	-.2
.3	.2	.1	.2	.1	.0	-.1	-.1	.0	.0	-.2	.0	.2	.2	.3	.3	.2	.0	.1	.1	.1	.0	.0	.0	-.1	.0	.0	.0	.0	-.1	-.2	-.1	.1	.0	.1	.3
.2	.2	.2	.3	.2	.0	.2	.3	.1	.0	.0	.1	.2	.3	.3	.2	.3	.1	.1	.0	.2	.1	.1	.1	.3	.3	.1	.3	.6	.5	.2	.1	.1	.3	.3	.3
.1	.1	.1	.2	.2	.1	.6	.6	.1	.0	.0	.1	.1	.1	.2	.2	.2	.3	.2	.1	.1	.2	.2	.5	.5	-.9	-1.7	-.9	.5	.0	.0	.0	.1	.2	.1	.2
.1	.0	.1	.1	.1	.1	.1	.5	.0	-.1	-.1	.0	.0	.1	.1	.1	.1	.2	.1	.0	-.1	.1	.2	.1	.3	.3	.0	-.5	.3	-.2	.0	.1	.1	.1	.1	.1
.0	-.1	.0	.1	.1	.0	.0	.0	-.1	-.1	-.1	.0	.1	.1	.1	.1	.0	-.2	-.4	.2	.3	.8	.4	.0	.0	.1	.0	-.2	-.3	.1	-.1	.0	.0	.0	.0	.0
-.3	-.2	-.2	-.1	-.1	-.2	-.2	-.1	.0	-.1	-.5	-.2	-.3	.0	.0	.0	-.2	-.5	-.6	-.6	-.3	.6	.5	.0	-.1	-.2	-.3	-.8	-.3	-.2	-.1	.0	-.2	-.2	-.3	-.3
-.2	-.1	-.1	.0	.0	.0	.1	.0	.1	.0	-.6	-.7	-.7	-.4	-.1	.0	.1	.1	-.1	-.5	-.4	.2	.0	-.2	-.2	-.3	-.3	-.3	-.3	-.2	-.2	-.3	-.4	-.2	-.3	-.3
-.2	-.2	-.2	.0	.0	.1	.1	.1	.1	.1	.1	.0	-.3	.0	.0	.1	.1	.1	.1	.4	.4	.1	-.1	-.2	-.1	-.1	-.1	.0	.0	-.1	.2	.3	.0	.0	-.1	-.2
.1	.0	-.1	-.1	.0	.0	.0	.1	.1	.1	.2	.4	-.2	-.1	.0	.1	.1	.1	.2	.3	.5	.2	-.1	-.1	.0	.1	.1	.1	.1	.1	.1	.3	.3	.0	.0	.0
.1	.2	.1	.1	.1	.1	.1	.1	.1	.1	.2	.2	-.1	.1	.1	.1	.1	.1	.2	.2	.2	.1	.1	.1	.1	.2	.2	.2	.2	.1	.1	.1	.2	.1	.1	.0
.2	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2	.3	.2	.2	.3	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2	.3	.3	.3	.2	.2	.2	.2	.2	.2	.2	.1
.2	.2	.2	.2	.2	.2	.2	.1	.2	.2	.0	-.1	.2	.2	.2	.2	.2	.2	.2	.3	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2	.1	.2	.3
.1	.1	.2	.2	.2	.2	.2	.1	.1	.1	.1	.0	-.2	-.1	-.1	.0	.0	.1	.1	.1	.1	.1	-.1	-.3	-.1	.1	-.1	-.1	-.1	.0	.0	-.1	-.2	-.1	.0	.1
.0	-.1	-.2	-.3	-.6	-.7	-.6	-.5	-.4	-.2	-.2	-.3	-.2	.0	-.1	-.3	-.7	-1.4	-2.3	-2.1	-2.0	-2.3	-2.6	-2.3	-2.0	-2.1	-1.9	-1.1	-2.0	-2.7	-2.9	-2.3	-2.1	-1.6	-.3	-.2
-1.1	-1.1	-1.0	-.7	-.7	-.9	-1.0	-1.5	-1.5	-.4	-.5	-.8	-.9	-.8	-1.1	-1.3	-1.8	-2.2	-2.6	-2.8	-3.2	-3.5	-3.7	-3.1	-3.6	-5.3	-6.1	-6.0	-5.5	-4.5	-4.1	-3.8	-3.2	-1.5	-1.2	-1.2

Figure 50. ATOVS SD O-B brightness temperature differences (deg C). APRIL 2003
Channel: AMSUA-5 (700 hPa)
NOAA16, using all observations



.3	.3	.3	.3	.3	.3	.3	.3	.4	.4	.5	.5	1.0	1.3	1.4	.6	.4	.4	.4	.4	.4	.3	.4	.5	.4	.4	.3	.4	.3	.3	.3	.3	.3	.3	.3	.3
.3	.3	.3	.3	.3	.4	.4	.3	.5	.5	.6	.9	2.0	2.2	2.4	1.6	.5	.5	.4	.6	.5	.4	.4	.4	.5	.5	.6	.5	.6	.6	.5	.5	.6	.4	.3	.3
.4	.4	.5	.7	.6	.6	.5	.5	.5	.5	.5	.5	.5	2.0	1.3	.6	.9	.4	.5	.5	.4	.4	.4	.5	.5	.5	.4	.7	.6	.5	.6	.7	.9	.6	.5	.5
.4	.4	.5	.4	.5	.6	.5	.5	.4	.4	.5	.5	.4	.4	.4	.4	.4	.5	.5	.4	.3	.4	.4	.5	.5	.5	.5	.6	.6	.6	.6	.5	.5	.5	.5	.4
.3	.3	.3	.3	.3	.5	.7	.7	.5	.5	.5	.5	.4	.4	.3	.3	.3	.5	.6	.5	.5	.8	.7	.6	.6	1.3	1.0	1.0	.7	.6	.4	.4	.5	.3	.4	.4
.3	.3	.3	.3	.3	.3	.7	.8	.6	.5	.5	.4	.4	.3	.3	.3	.3	.7	.6	.5	.6	.7	.8	.9	1.0	1.8	2.1	2.3	1.1	.7	.5	.6	.4	.4	.4	.3
.3	.3	.3	.2	.2	.2	.5	.8	.6	.7	.6	.5	.4	.2	.2	.2	.5	.7	.5	.8	.8	.6	.7	1.0	.6	.6	1.3	1.4	1.1	.7	.6	.3	.3	.3	.3	.3
.3	.3	.4	.3	.3	.4	.3	.3	.5	.4	.5	.6	.3	.2	.3	.2	.5	.9	.8	1.0	.9	1.0	.9	.4	.2	.6	.4	.6	.8	.3	.5	.3	.3	.3	.3	.3
.6	.6	.6	.6	.6	.7	.7	.6	.4	.5	.9	.8	.8	.4	.4	.5	.7	1.1	1.1	1.2	1.1	1.3	1.1	.3	.3	.5	.5	.7	.6	.6	.6	.4	.5	.5	.6	.5
.4	.4	.4	.3	.3	.3	.3	.3	.3	.3	.8	.9	.8	.8	.5	.4	.3	.3	.5	1.1	1.0	.8	.4	.5	.5	.7	.5	.5	.8	.7	.6	.8	.8	.5	.5	.6
.6	.5	.6	.3	.4	.2	.2	.3	.3	.3	.8	1.2	.7	.6	.4	.2	.2	.2	.3	.9	.7	.5	.5	.6	.6	.5	.5	.4	.3	.5	.6	.5	.5	.4	.4	.5
.4	.4	.5	.5	.4	.4	.4	.3	.3	.3	.4	1.3	1.0	.5	.3	.3	.3	.3	.3	.7	.7	.5	.6	.6	.5	.3	.3	.3	.3	.6	.7	.6	.6	.4	.3	.5
.3	.4	.4	.4	.4	.4	.4	.4	.3	.3	.5	.9	.8	.4	.4	.4	.4	.4	.3	.4	.6	.5	.4	.4	.3	.3	.3	.3	.3	.4	.4	.5	.5	.4	.3	.4
.3	.4	.4	.3	.4	.3	.4	.4	.4	.3	.6	.5	.4	.3	.4	.4	.4	.4	.4	.4	.4	.4	.4	.3	.4	.4	.4	.4	.4	.3	.3	.3	.4	.3	.4	.4
.4	.5	.4	.4	.5	.4	.4	.4	.4	.4	.5	.5	.4	.4	.4	.3	.4	.4	.4	.4	.4	.4	.4	.4	.4	.4	.4	.4	.4	.4	.4	.4	.5	.4	.5	.5
.5	.5	.5	.5	.4	.4	.5	.5	.4	.4	.5	.7	.6	.5	.5	.4	.5	.4	.4	.5	.5	.5	.7	.9	.7	.6	.8	.9	.9	.7	.8	.8	.7	.6	.6	.5
.7	.7	.7	.8	1.1	1.5	1.4	1.1	1.3	1.1	1.0	1.1	.7	.6	.7	.8	1.3	1.6	2.0	2.1	2.2	1.9	1.6	1.5	1.5	1.6	1.8	2.2	2.7	2.8	2.6	1.8	1.5	1.5	.9	.7
.9	.9	.9	.9	1.0	1.3	1.5	2.0	2.1	1.2	.8	.7	.8	.9	1.0	1.2	1.1	1.2	1.2	1.5	1.7	1.6	1.7	1.6	1.9	2.3	2.3	2.1	1.9	1.5	1.3	1.3	1.4	1.5	1.1	.9

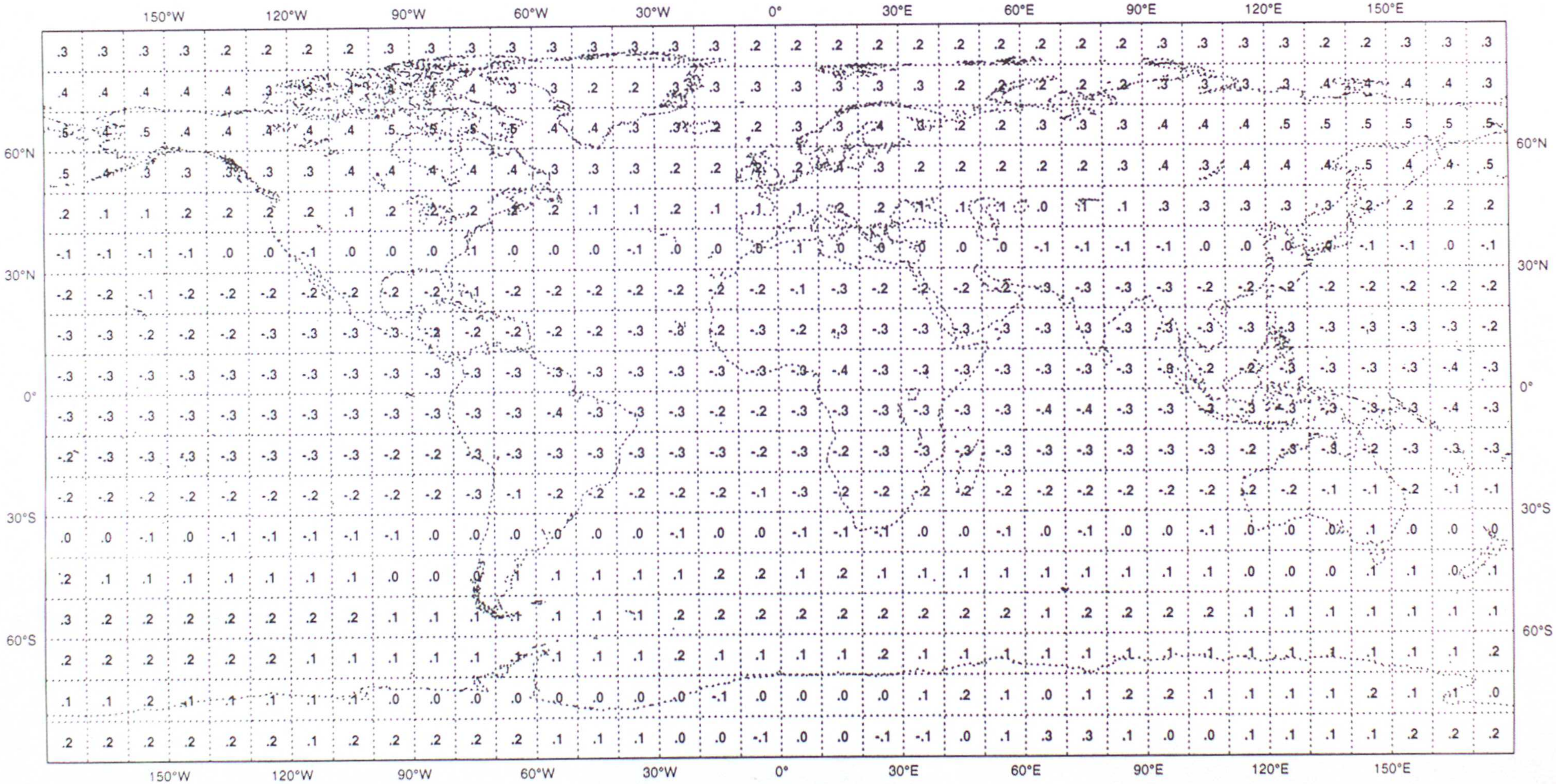

150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S

Figure 51. ATOVS MEAN O-B brightness temperature differences (deg C). APRIL 2003
Channel: AMSUA-7 (300 hPa)
NOAA16, using all observations

Figure 52. ATOVS SD O-B brightness temperature differences (deg C). APRIL 2003
Channel: AMSUA-7 (300 hPa)
NOAA16, using all observations

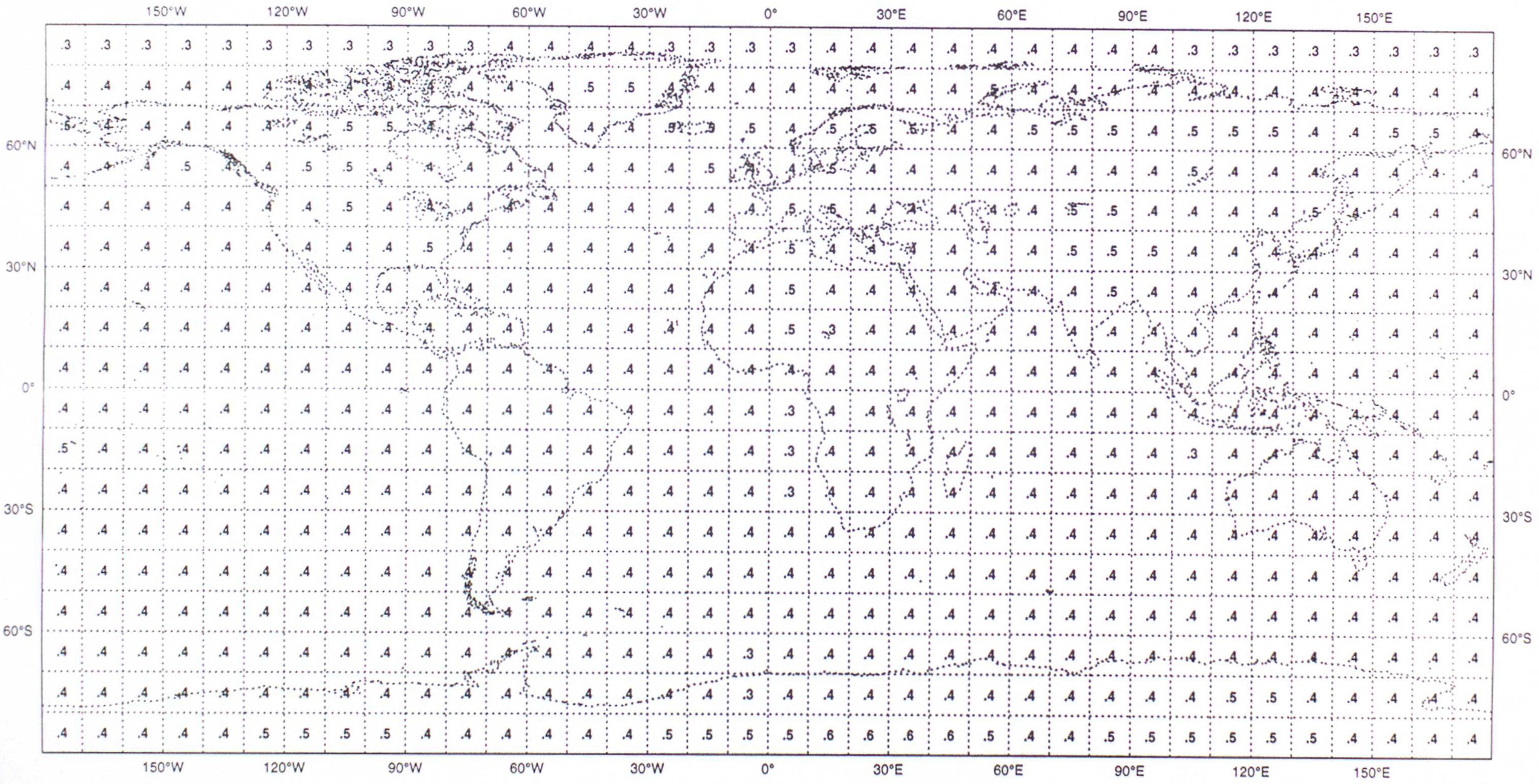
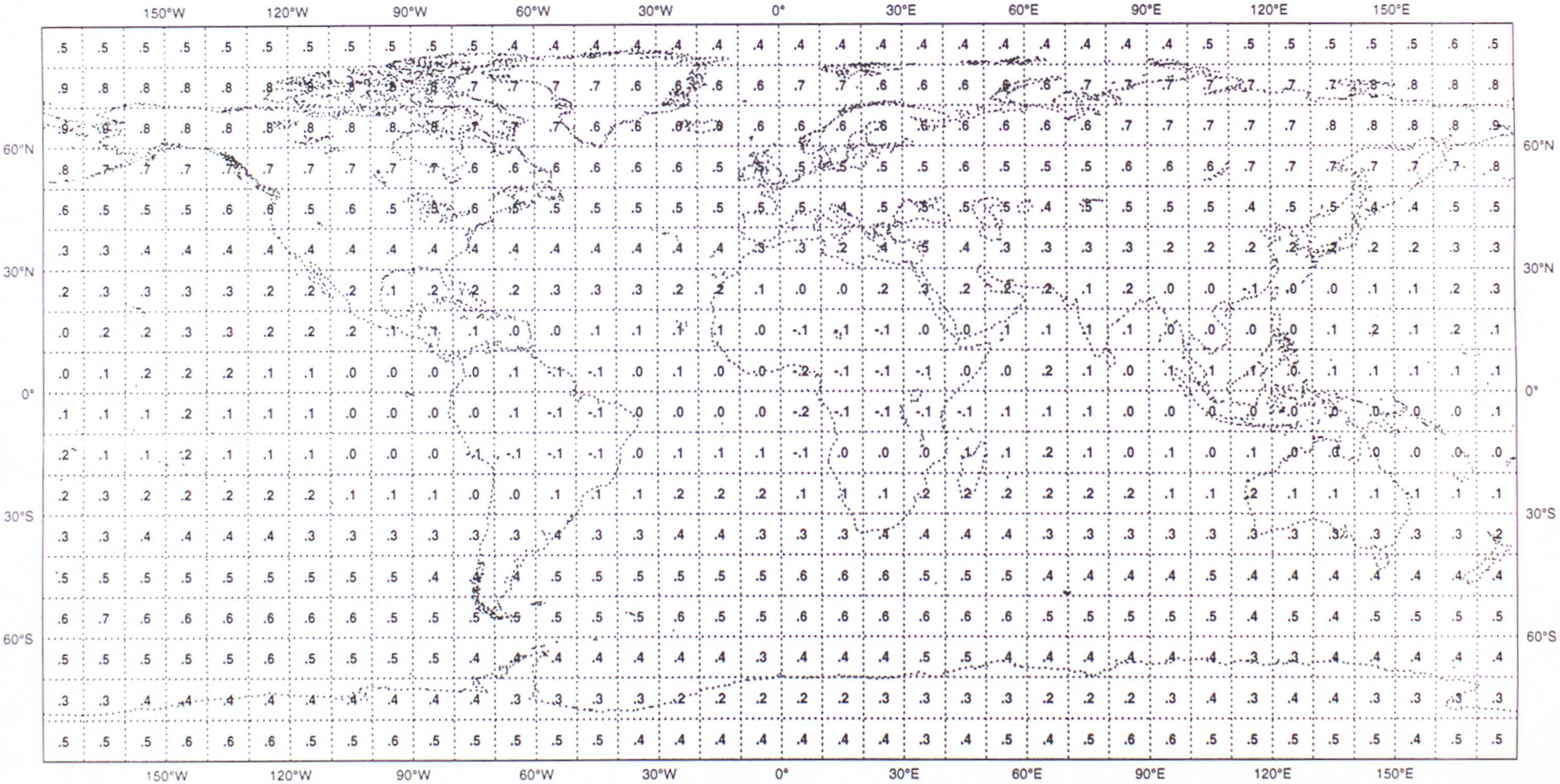

150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S

Figure 53. ATOVS MEAN O-B brightness temperature differences (deg C). APRIL 2003
Channel: AMSUA-9 (100 hPa)
NOAA16, using all observations



.5	.5	.5	.5	.5	.5	.5	.5	.5	.5	.5	.4	.4	.4	.4	.4	.4	.4	.4	.4	.4	.4	.4	.4	.4	.4	.4	.4	.5	.5	.5	.5	.5	.5	.6	.5
.9	.8	.8	.8	.8	.8	.8	.8	.8	.8	.7	.7	.7	.7	.6	.6	.6	.6	.7	.7	.6	.6	.6	.6	.6	.7	.7	.7	.7	.7	.7	.7	.8	.8	.8	.8
.9	.9	.8	.8	.8	.8	.8	.8	.8	.8	.7	.7	.7	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.7	.7	.7	.7	.7	.8	.8	.8	.8	.9
.8	.7	.7	.7	.7	.7	.7	.7	.7	.7	.6	.6	.6	.6	.6	.6	.5	.5	.5	.5	.5	.5	.6	.5	.5	.5	.6	.6	.6	.7	.7	.7	.7	.7	.7	.8
.6	.5	.5	.5	.6	.6	.5	.6	.5	.5	.6	.5	.5	.5	.5	.5	.5	.5	.5	.4	.5	.5	.5	.5	.4	.5	.5	.5	.5	.4	.5	.5	.4	.4	.5	.5
.3	.3	.4	.4	.4	.4	.4	.4	.4	.4	.4	.4	.4	.4	.4	.4	.4	.3	.3	.2	.4	.5	.4	.3	.3	.3	.3	.2	.2	.2	.2	.2	.2	.2	.3	.3
.2	.3	.3	.3	.3	.2	.2	.2	.1	.2	.2	.2	.3	.3	.3	.2	.2	.1	.0	.0	.2	.3	.2	.2	.2	.1	.2	.0	.0	-.1	.0	.0	.1	.1	.2	.3
.0	.2	.2	.3	.3	.2	.2	.2	.1	.1	.1	.0	.0	.1	.1	.1	.1	.0	-.1	-.1	-.1	.0	.0	.1	.1	.1	.1	.0	.0	.0	.0	.1	.2	.1	.2	.1
.0	.1	.2	.2	.2	.1	.1	.0	.0	.0	.0	.1	-.1	-.1	.0	.1	.0	.0	-.2	-.1	-.1	-.1	.0	.0	.2	.1	.0	.1	.1	.1	.0	.1	.1	.1	.1	.1
.1	.1	.1	.2	.1	.1	.1	.0	.0	.0	.0	.1	-.1	-.1	.0	.0	.0	.0	-.2	-.1	-.1	-.1	-.1	.1	.1	.1	.0	.0	.0	.0	.0	.0	.0	.0	.0	.1
.2	.1	.1	.2	.1	.1	.1	.0	.0	.0	-.1	-.1	-.1	-.1	.0	.1	.1	.1	-.1	.0	.0	.0	.1	.1	.2	.1	.0	.1	.0	.1	.0	.0	.0	.0	.0	.0
.2	.3	.2	.2	.2	.2	.2	.1	.1	.1	.0	.0	.1	.1	.1	.2	.2	.2	.1	.1	.1	.2	.2	.2	.2	.2	.2	.1	.1	.2	.1	.1	.1	.1	.1	.1
.3	.3	.4	.4	.4	.4	.3	.3	.3	.3	.3	.3	.4	.3	.3	.4	.4	.3	.3	.3	.4	.4	.4	.4	.3	.3	.3	.3	.3	.3	.3	.3	.3	.3	.3	.2
.5	.5	.5	.5	.5	.5	.5	.5	.5	.4	.4	.4	.5	.5	.5	.5	.5	.5	.6	.6	.6	.5	.5	.5	.4	.4	.4	.4	.5	.4	.4	.4	.4	.4	.4	.4
.6	.7	.6	.6	.6	.6	.6	.6	.5	.5	.5	.5	.5	.5	.5	.6	.5	.5	.6	.6	.6	.6	.6	.6	.5	.5	.5	.5	.5	.4	.5	.4	.5	.5	.5	.5
.5	.5	.5	.5	.5	.6	.5	.5	.5	.5	.4	.4	.4	.4	.4	.4	.4	.3	.4	.4	.4	.5	.5	.4	.4	.4	.4	.4	.4	.3	.3	.4	.4	.4	.4	.4
.3	.3	.4	.4	.4	.4	.4	.4	.4	.4	.4	.3	.3	.3	.3	.2	.2	.2	.2	.2	.3	.3	.3	.3	.2	.2	.2	.3	.4	.3	.4	.4	.3	.3	.3	.3
.5	.5	.5	.6	.6	.6	.5	.5	.6	.5	.5	.5	.5	.5	.4	.4	.4	.4	.4	.4	.4	.3	.4	.5	.4	.5	.6	.6	.5	.5	.5	.5	.5	.4	.5	.5

Figure 54. ATOVS SD O-B brightness temperature differences (deg C). APRIL 2003
Channel: AMSUA-9 (100 hPa)
NOAA16, using all observations

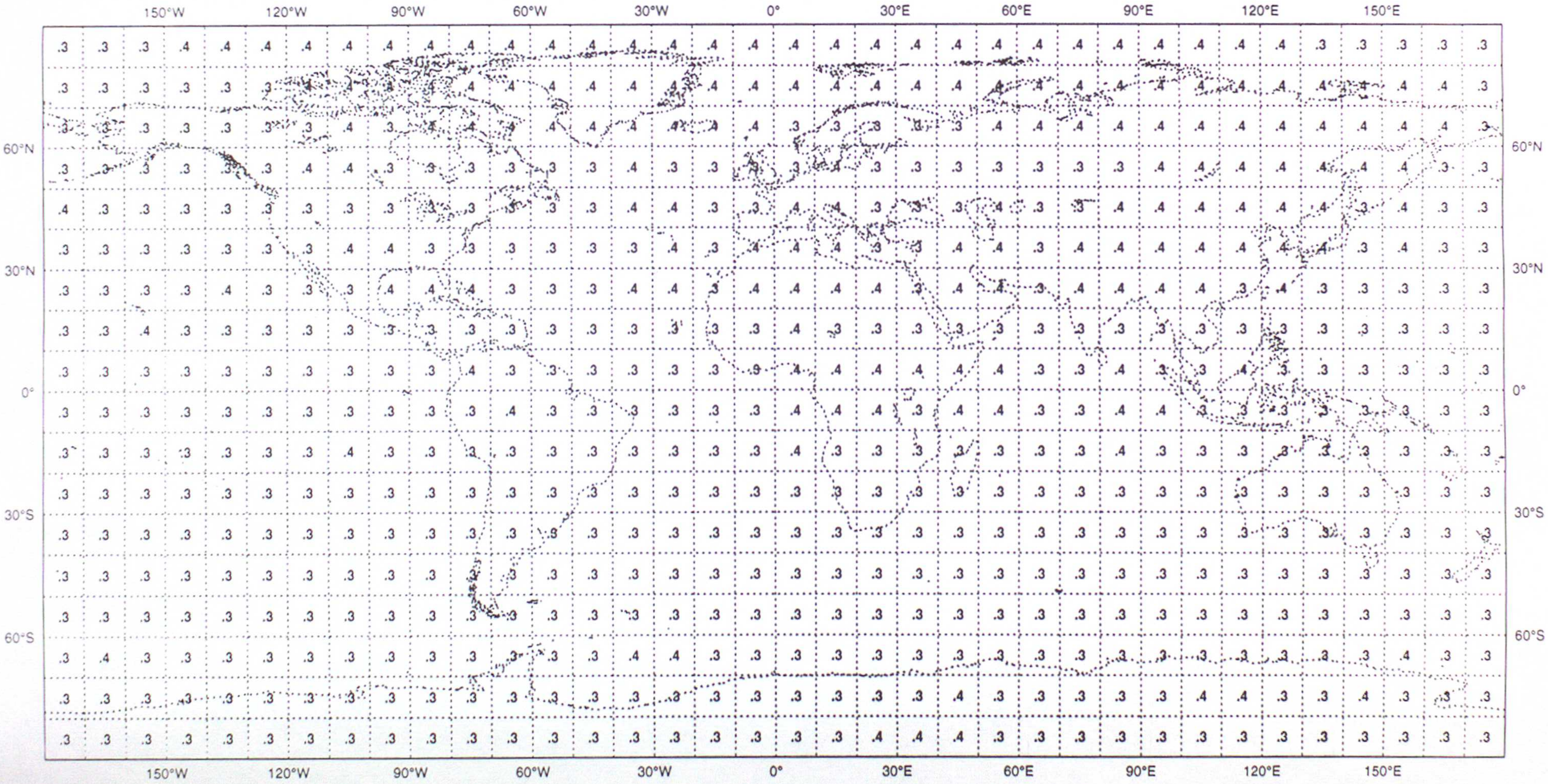
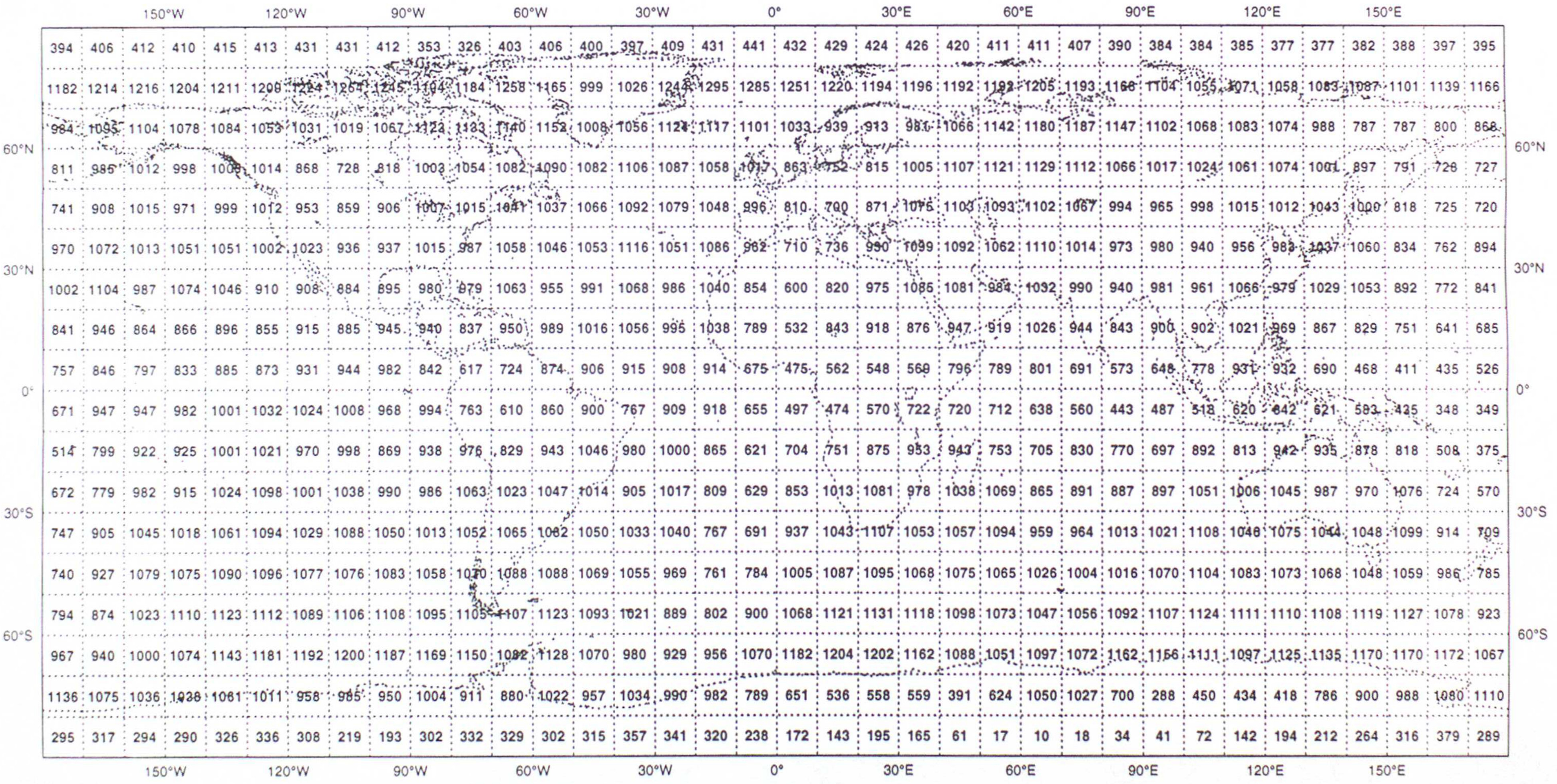
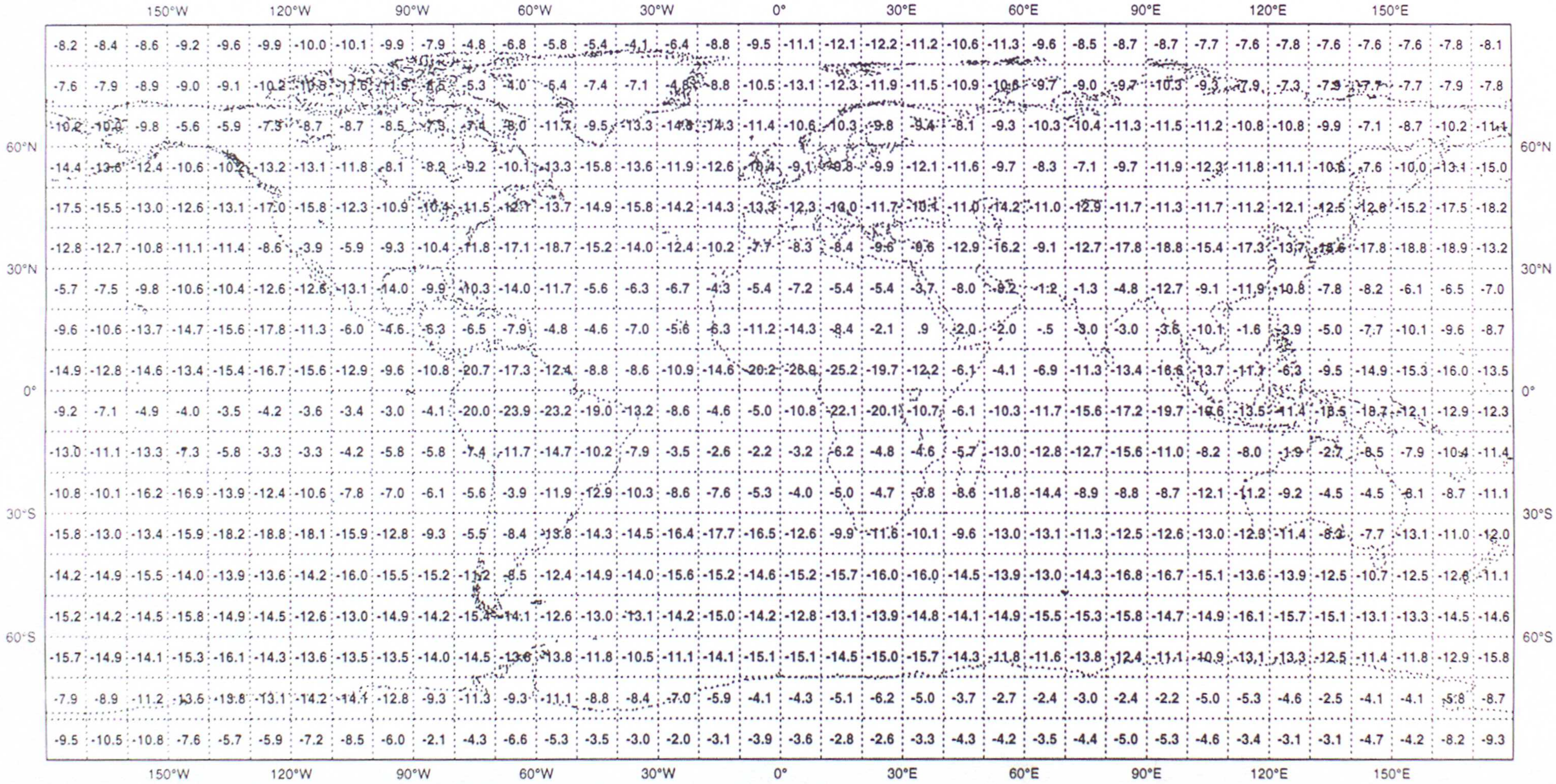

150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S

Figure 55. ATOVS mean daily count. APRIL 2003
NOAA17, using all observations
Global average number of observations in 24 hours = 573485



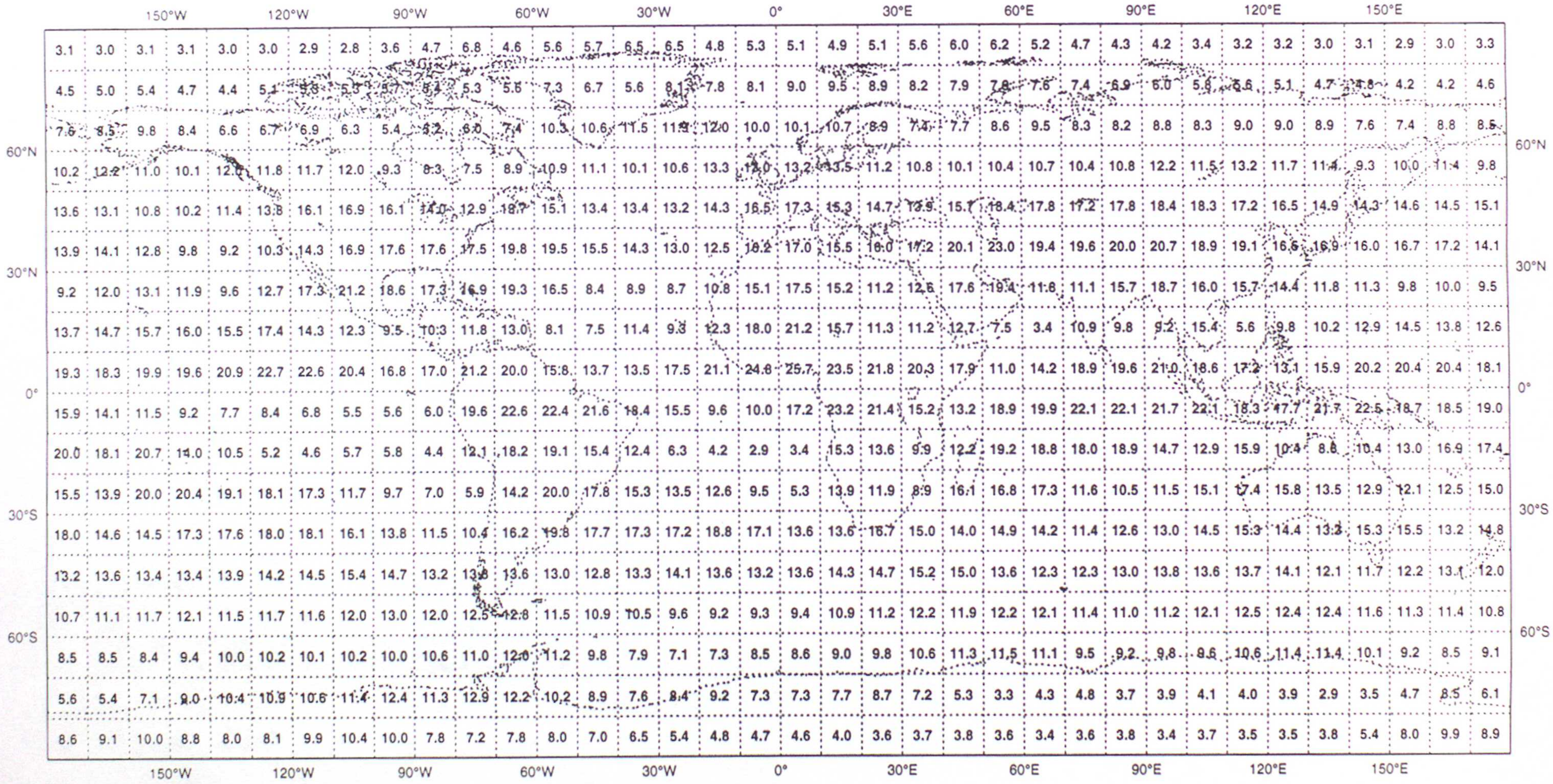
394	406	412	410	415	413	431	431	412	353	326	403	406	400	397	409	431	441	432	429	424	426	420	411	411	407	390	384	384	385	377	377	382	388	397	395
1182	1214	1216	1204	1211	1208	1224	1264	1245	1104	1184	1258	1165	999	1026	1244	1295	1285	1251	1220	1194	1196	1192	1192	1205	1193	1166	1104	1055	1071	1058	1083	1087	1101	1139	1166
984	1095	1104	1078	1084	1053	1031	1019	1067	1122	1133	1140	1152	1008	1056	1124	1117	1101	1033	939	913	981	1066	1142	1180	1187	1147	1102	1068	1083	1074	988	787	787	800	868
811	985	1012	998	1008	1014	868	728	818	1003	1054	1082	1090	1082	1106	1087	1058	1017	863	752	815	1005	1107	1121	1129	1112	1066	1017	1024	1061	1074	1001	897	791	728	727
741	908	1015	971	999	1012	953	859	906	1007	1015	1041	1037	1066	1092	1079	1048	996	810	700	871	1076	1103	1093	1102	1067	994	965	998	1015	1012	1043	1000	818	725	720
970	1072	1013	1051	1051	1002	1023	936	937	1015	987	1058	1046	1053	1116	1051	1086	962	710	736	990	1099	1092	1062	1110	1014	973	980	940	956	983	1037	1060	834	762	894
1002	1104	987	1074	1046	910	908	884	895	980	979	1063	955	991	1068	986	1040	854	600	820	975	1085	1081	984	1032	990	940	981	961	1066	979	1029	1053	892	772	841
841	946	864	866	896	855	915	885	945	940	837	950	989	1016	1056	995	1038	789	532	843	918	876	947	919	1026	944	843	900	902	1021	969	867	829	751	641	685
757	846	797	833	885	873	931	944	982	842	617	724	874	906	915	908	914	675	475	562	548	569	796	789	801	691	573	648	778	931	932	690	468	411	435	526
671	947	947	982	1001	1032	1024	1008	968	994	763	610	860	900	767	909	918	655	497	474	570	722	720	712	638	560	443	487	518	620	642	621	583	435	348	349
514	799	922	925	1001	1021	970	998	869	938	976	829	943	1046	980	1000	865	621	704	751	875	953	943	753	705	830	770	697	892	813	942	935	878	818	508	375
672	779	982	915	1024	1098	1001	1038	990	986	1063	1023	1047	1014	905	1017	809	629	853	1013	1081	978	1038	1069	865	891	887	897	1051	1006	1045	987	970	1076	724	570
747	905	1045	1018	1061	1094	1029	1088	1050	1013	1052	1065	1082	1050	1033	1040	767	691	937	1043	1107	1053	1057	1094	959	964	1013	1021	1108	1046	1075	1044	1048	1099	914	709
740	927	1079	1075	1090	1096	1077	1076	1083	1058	1070	1088	1088	1069	1055	969	761	784	1005	1087	1095	1068	1075	1065	1026	1004	1016	1070	1104	1083	1073	1068	1048	1059	986	785
794	874	1023	1110	1123	1112	1089	1106	1108	1095	1105	1107	1123	1093	1021	889	802	900	1068	1121	1131	1118	1098	1073	1047	1056	1092	1107	1124	1111	1110	1108	1119	1127	1078	923
967	940	1000	1074	1143	1181	1192	1200	1187	1169	1150	1092	1128	1070	980	929	956	1070	1182	1204	1202	1162	1088	1051	1097	1072	1162	1156	1111	1097	1125	1135	1170	1170	1172	1067
1136	1075	1036	1038	1061	1011	958	985	950	1004	911	880	1022	957	1034	990	982	789	651	536	558	559	391	624	1050	1027	700	288	450	434	418	786	900	988	1080	1110
295	317	294	290	326	336	308	219	193	302	332	329	302	315	357	341	320	238	172	143	195	165	61	17	10	18	34	41	72	142	194	212	264	316	379	289

Figure 56. ATOVS MEAN O-B brightness temperature differences (deg C). APRIL 2003
Channel: HIRS8 (Surface)
NOAA17, using all observations



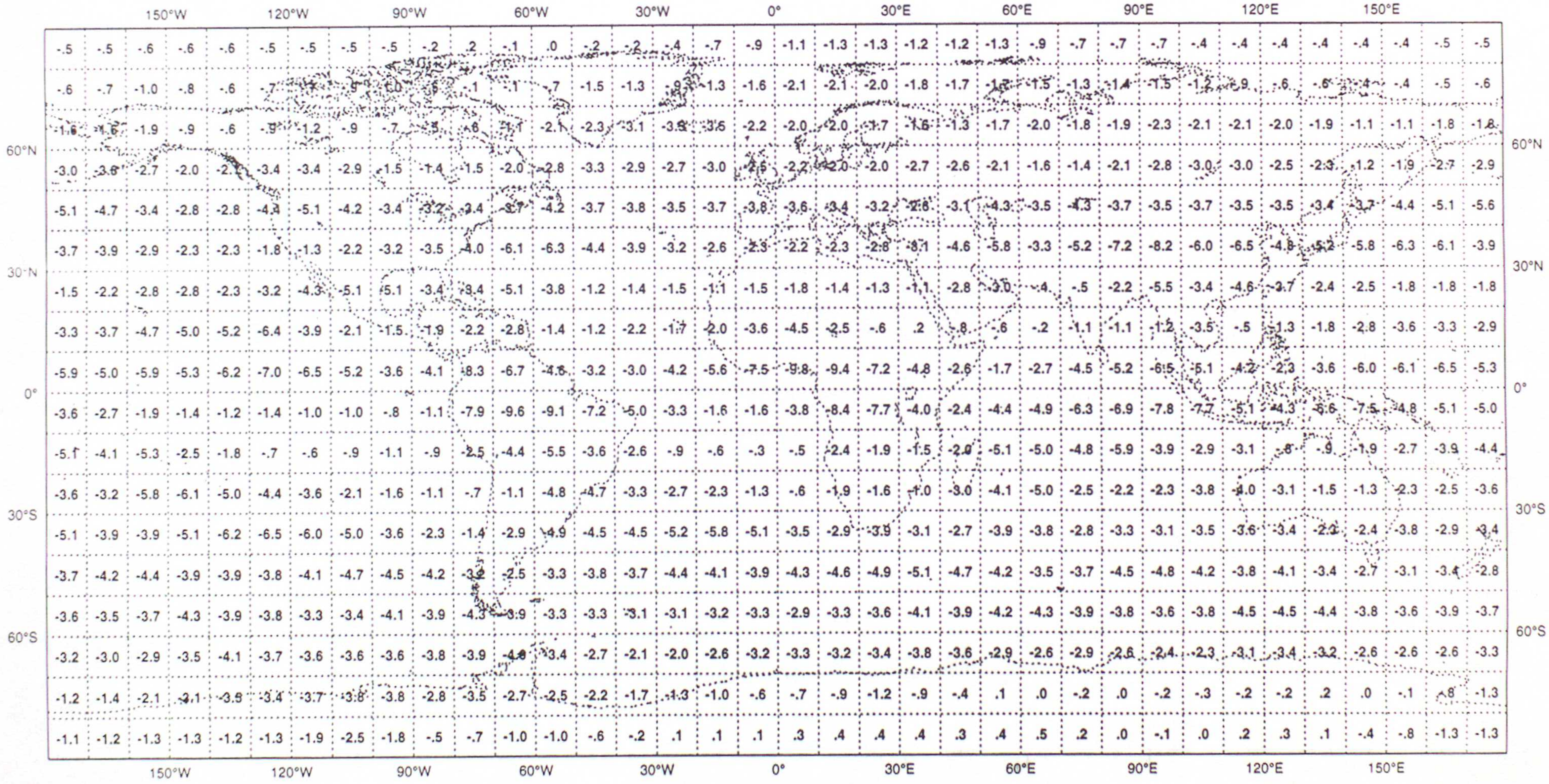
-8.2	-8.4	-8.6	-9.2	-9.6	-9.9	-10.0	-10.1	-9.9	-7.9	-4.8	-6.8	-5.8	-5.4	-4.1	-6.4	-8.8	-9.5	-11.1	-12.1	-12.2	-11.2	-10.6	-11.3	-9.6	-8.5	-8.7	-8.7	-7.7	-7.6	-7.8	-7.6	-7.6	-7.6	-7.8	-8.1
-7.6	-7.9	-8.9	-9.0	-9.1	-10.2	-10.8	-11.6	-11.9	-4.5	-5.3	-4.0	-6.4	-7.4	-7.1	-4.8	-8.8	-10.5	-13.1	-12.3	-11.9	-11.5	-10.9	-10.6	-9.7	-9.0	-9.7	-10.3	-9.3	-7.9	-7.3	-7.9	-7.7	-7.7	-7.9	-7.8
-10.2	-10.0	-9.8	-5.6	-5.9	-7.3	-8.7	-8.7	-8.5	-7.3	-7.4	-8.0	-11.7	-9.5	-13.3	-14.8	-14.3	-11.4	-10.6	-10.3	-9.8	-9.4	-8.1	-9.3	-10.3	-10.4	-11.3	-11.5	-11.2	-10.8	-10.8	-9.9	-7.1	-8.7	-10.2	-11.1
-14.4	-13.6	-12.4	-10.6	-10.2	-13.2	-13.1	-11.8	-8.1	-8.2	-9.2	-10.1	-13.3	-15.8	-13.6	-11.9	-12.6	-10.4	-9.1	-10.8	-9.9	-12.1	-11.6	-9.7	-8.3	-7.1	-9.7	-11.9	-12.3	-11.8	-11.1	-10.6	-7.6	-10.0	-13.1	-15.0
-17.5	-15.5	-13.0	-12.6	-13.1	-17.0	-15.8	-12.3	-10.9	-10.4	-11.5	-12.1	-13.7	-14.9	-15.8	-14.2	-14.3	-13.3	-12.3	-10.0	-11.7	-10.4	-11.0	-14.2	-11.0	-12.9	-11.7	-11.3	-11.7	-11.2	-12.1	-12.5	-12.8	-15.2	-17.5	-18.2
-12.8	-12.7	-10.8	-11.1	-11.4	-8.6	-3.9	-5.9	-9.3	-10.4	-11.8	-17.1	-18.7	-15.2	-14.0	-12.4	-10.2	-7.7	-8.3	-8.4	-9.6	-8.6	-12.9	-16.2	-9.1	-12.7	-17.8	-18.8	-15.4	-17.3	-13.7	-15.6	-17.8	-18.8	-18.9	-13.2
-5.7	-7.5	-9.8	-10.6	-10.4	-12.6	-12.6	-13.1	-14.0	-9.9	-10.3	-14.0	-11.7	-5.6	-6.3	-6.7	-4.3	-5.4	-7.2	-5.4	-5.4	-3.7	-8.0	-8.2	-1.2	-1.3	-4.8	-12.7	-9.1	-11.9	-10.8	-7.8	-8.2	-6.1	-6.5	-7.0
-9.6	-10.6	-13.7	-14.7	-15.6	-17.8	-11.3	-6.0	-4.6	-6.3	-6.5	-7.9	-4.8	-4.6	-7.0	-5.6	-6.3	-11.2	-14.3	-8.4	-2.1	.9	-2.0	-2.0	-.5	-3.0	-3.0	-3.6	-10.1	-1.6	-3.9	-5.0	-7.7	-10.1	-9.6	-8.7
-14.9	-12.8	-14.6	-13.4	-15.4	-16.7	-15.6	-12.9	-9.6	-10.8	-20.7	-17.3	-12.4	-8.8	-8.6	-10.9	-14.6	-20.2	-26.8	-25.2	-19.7	-12.2	-6.1	-4.1	-6.9	-11.3	-13.4	-16.6	-13.7	-11.7	-6.3	-9.5	-14.9	-15.3	-16.0	-13.5
-9.2	-7.1	-4.9	-4.0	-3.5	-4.2	-3.6	-3.4	-3.0	-4.1	-20.0	-23.9	-23.2	-19.0	-13.2	-8.6	-4.6	-5.0	-10.8	-22.1	-20.1	-10.7	-6.1	-10.3	-11.7	-15.6	-17.2	-19.7	-19.6	-13.5	-11.4	-18.5	-18.7	-12.1	-12.9	-12.3
-13.0	-11.1	-13.3	-7.3	-5.8	-3.3	-3.3	-4.2	-5.8	-5.8	-7.4	-11.7	-14.7	-10.2	-7.9	-3.5	-2.6	-2.2	-3.2	-6.2	-4.8	-4.6	-5.7	-13.0	-12.8	-12.7	-15.6	-11.0	-8.2	-8.0	-1.9	-2.7	-8.5	-7.9	-10.4	-11.4
-10.8	-10.1	-16.2	-16.9	-13.9	-12.4	-10.6	-7.8	-7.0	-6.1	-5.6	-3.9	-11.9	-12.9	-10.3	-8.6	-7.6	-5.3	-4.0	-5.0	-4.7	-3.8	-8.6	-11.8	-14.4	-8.9	-8.8	-8.7	-12.1	-11.2	-9.2	-4.5	-4.5	-8.1	-8.7	-11.1
-15.8	-13.0	-13.4	-15.9	-18.2	-18.8	-18.1	-15.9	-12.8	-9.3	-5.5	-8.4	-13.8	-14.3	-14.5	-16.4	-17.7	-16.5	-12.6	-9.9	-11.6	-10.1	-9.6	-13.0	-13.1	-11.3	-12.5	-12.6	-13.0	-12.8	-11.4	-8.2	-7.7	-13.1	-11.0	-12.0
-14.2	-14.9	-15.5	-14.0	-13.9	-13.6	-14.2	-16.0	-15.5	-15.2	-11.2	-8.5	-12.4	-14.9	-14.0	-15.6	-15.2	-14.6	-15.2	-15.7	-16.0	-16.0	-14.5	-13.9	-13.0	-14.3	-16.8	-16.7	-15.1	-13.6	-13.9	-12.5	-10.7	-12.5	-12.6	-11.1
-15.2	-14.2	-14.5	-15.8	-14.9	-14.5	-12.6	-13.0	-14.9	-14.2	-15.4	-14.1	-12.6	-13.0	-13.1	-14.2	-15.0	-14.2	-12.8	-13.1	-13.9	-14.8	-14.1	-14.9	-15.5	-15.3	-15.8	-14.7	-14.9	-16.1	-15.7	-15.1	-13.1	-13.3	-14.5	-14.6
-15.7	-14.9	-14.1	-15.3	-16.1	-14.3	-13.6	-13.5	-13.5	-14.0	-14.5	-13.6	-13.8	-11.8	-10.5	-11.1	-14.1	-15.1	-15.1	-14.5	-15.0	-15.7	-14.3	-11.8	-11.6	-13.8	-12.4	-11.1	-10.9	-13.1	-13.3	-12.5	-11.4	-11.8	-12.9	-15.8
-7.9	-8.9	-11.2	-13.6	-13.8	-13.1	-14.2	-14.1	-12.8	-9.3	-11.3	-9.3	-11.1	-8.8	-8.4	-7.0	-5.9	-4.1	-4.3	-5.1	-6.2	-5.0	-3.7	-2.7	-2.4	-3.0	-2.4	-2.2	-5.0	-5.3	-4.6	-2.5	-4.1	-4.1	-5.8	-8.7
-9.5	-10.5	-10.8	-7.6	-5.7	-5.9	-7.2	-8.5	-6.0	-2.1	-4.3	-6.6	-5.3	-3.5	-3.0	-2.0	-3.1	-3.9	-3.6	-2.8	-2.6	-3.3	-4.3	-4.2	-3.5	-4.4	-5.0	-5.3	-4.6	-3.4	-3.1	-3.1	-4.7	-4.2	-8.2	-9.3

Figure 57. ATOVS SD O-B brightness temperature differences (deg C). APRIL 2003
Channel: HIRS8 (Surface)
NOAA17, using all observations



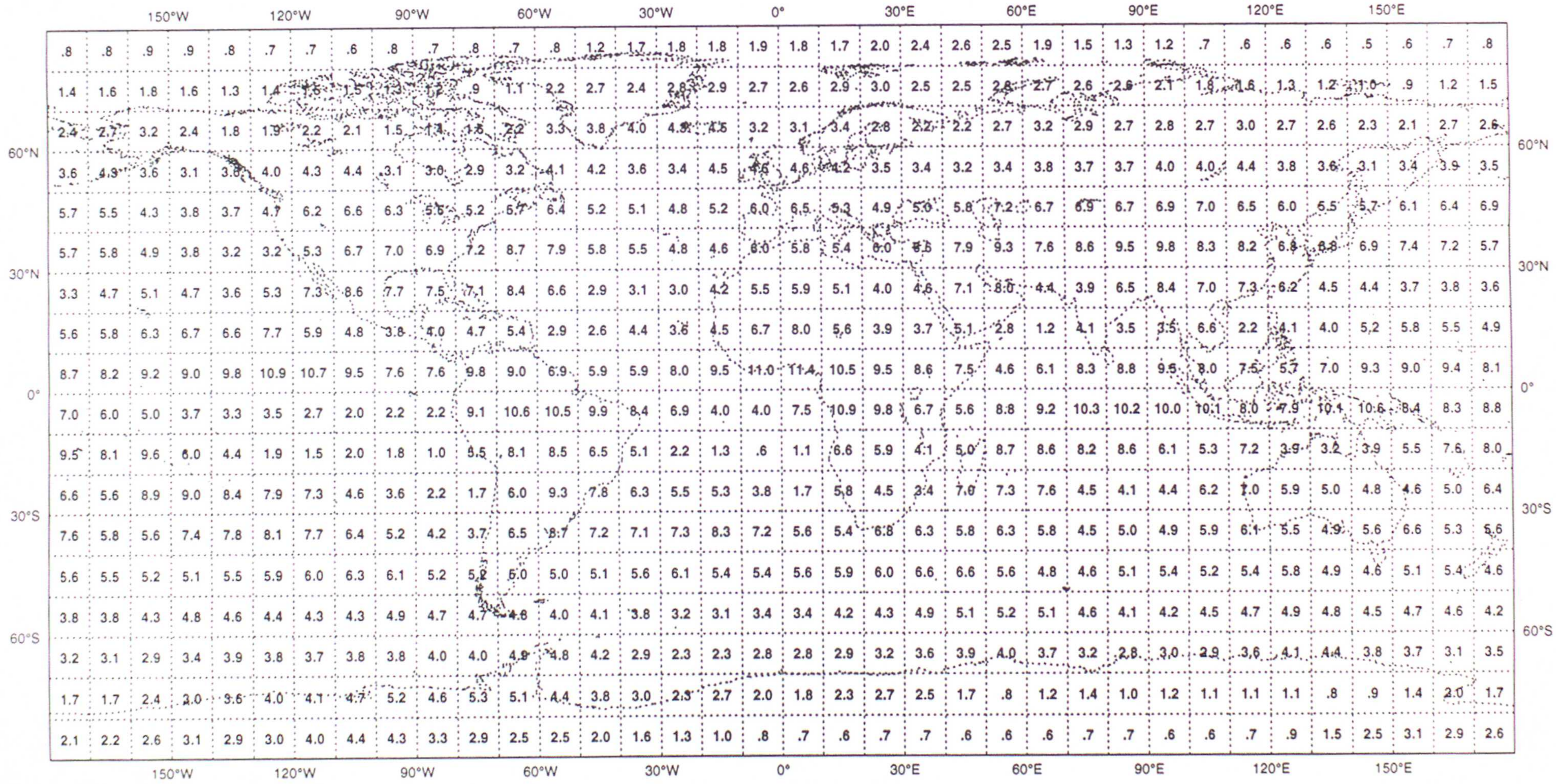
3.1	3.0	3.1	3.1	3.0	3.0	2.9	2.8	3.6	4.7	6.8	4.6	5.6	5.7	6.5	6.5	4.8	5.3	5.1	4.9	5.1	5.6	6.0	6.2	5.2	4.7	4.3	4.2	3.4	3.2	3.2	3.0	3.1	2.9	3.0	3.3
4.5	5.0	5.4	4.7	4.4	5.1	5.8	5.3	5.7	5.4	5.3	5.6	7.3	6.7	5.6	8.1	7.8	8.1	9.0	9.5	8.9	8.2	7.9	7.8	7.6	7.4	6.9	6.0	5.6	5.6	5.1	4.7	4.8	4.2	4.2	4.6
7.6	8.5	9.8	8.4	6.6	6.7	6.9	6.3	5.4	5.2	6.0	7.4	10.3	10.6	11.5	11.9	12.0	10.0	10.1	10.7	8.9	7.4	7.7	8.6	9.5	8.3	8.2	8.8	8.3	9.0	9.0	8.9	7.6	7.4	8.8	8.5
10.2	12.2	11.0	10.1	12.0	11.8	11.7	12.0	9.3	8.3	7.5	8.9	10.9	11.1	10.1	10.6	13.3	14.0	13.2	13.5	11.2	10.8	10.1	10.4	10.7	10.4	10.8	12.2	11.5	13.2	11.7	11.4	9.3	10.0	11.4	9.8
13.6	13.1	10.8	10.2	11.4	13.8	16.1	16.9	16.1	14.0	12.9	18.7	15.1	13.4	13.4	13.2	14.3	16.5	17.3	15.3	14.7	13.9	15.1	18.4	17.8	17.2	17.8	18.4	18.3	17.2	16.5	14.9	14.3	14.6	14.5	15.1
13.9	14.1	12.8	9.8	9.2	10.3	14.3	16.9	17.6	17.6	17.5	19.8	19.5	15.5	14.3	13.0	12.5	18.2	17.0	15.5	16.0	17.2	20.1	23.0	19.4	19.6	20.0	20.7	18.9	19.1	16.6	16.9	16.0	16.7	17.2	14.1
9.2	12.0	13.1	11.9	9.6	12.7	17.3	21.2	18.6	17.3	16.9	19.3	16.5	8.4	8.9	8.7	10.8	15.1	17.5	15.2	11.2	12.6	17.6	19.4	11.8	11.1	15.7	18.7	16.0	15.7	14.4	11.8	11.3	9.8	10.0	9.5
13.7	14.7	15.7	16.0	15.5	17.4	14.3	12.3	9.5	10.3	11.8	13.0	8.1	7.5	11.4	9.3	12.3	18.0	21.2	15.7	11.3	11.2	12.7	7.5	3.4	10.9	9.8	9.2	15.4	5.6	9.8	10.2	12.9	14.5	13.8	12.6
19.3	18.3	19.9	19.6	20.9	22.7	22.6	20.4	16.8	17.0	21.2	20.0	15.8	13.7	13.5	17.5	21.1	24.8	25.7	23.5	21.8	20.3	17.9	11.0	14.2	18.9	19.6	21.0	18.6	17.2	13.1	15.9	20.2	20.4	20.4	18.1
15.9	14.1	11.5	9.2	7.7	8.4	6.8	5.5	5.6	6.0	19.6	22.6	22.4	21.6	18.4	15.5	9.6	10.0	17.2	23.2	21.4	15.2	13.2	18.9	19.9	22.1	22.1	21.7	22.1	18.3	17.7	21.7	22.5	18.7	18.5	19.0
20.0	18.1	20.7	14.0	10.5	5.2	4.6	5.7	5.8	4.4	12.1	18.2	19.1	15.4	12.4	6.3	4.2	2.9	3.4	15.3	13.6	9.9	12.2	19.2	18.8	18.0	18.9	14.7	12.9	15.9	10.4	8.8	10.4	13.0	16.9	17.4
15.5	13.9	20.0	20.4	19.1	18.1	17.3	11.7	9.7	7.0	5.9	14.2	20.0	17.8	15.3	13.5	12.6	9.5	5.3	13.9	11.9	8.9	16.1	16.8	17.3	11.6	10.5	11.5	15.1	17.4	15.8	13.5	12.9	12.1	12.5	15.0
18.0	14.6	14.5	17.3	17.6	18.0	18.1	16.1	13.8	11.5	10.4	16.2	19.8	17.7	17.3	17.2	18.8	17.1	13.6	13.6	16.7	15.0	14.0	14.9	14.2	11.4	12.6	13.0	14.5	15.3	14.4	13.3	15.3	15.5	13.2	14.8
13.2	13.6	13.4	13.4	13.9	14.2	14.5	15.4	14.7	13.2	13.8	13.6	13.0	12.8	13.3	14.1	13.6	13.2	13.6	14.3	14.7	15.2	15.0	13.6	12.3	12.3	13.0	13.8	13.6	13.7	14.1	12.1	11.7	12.2	13.1	12.0
10.7	11.1	11.7	12.1	11.5	11.7	11.6	12.0	13.0	12.0	12.5	12.8	11.5	10.9	10.5	9.6	9.2	9.3	9.4	10.9	11.2	12.2	11.9	12.2	12.1	11.4	11.0	11.2	12.1	12.5	12.4	12.4	11.6	11.3	11.4	10.8
8.5	8.5	8.4	9.4	10.0	10.2	10.1	10.2	10.0	10.6	11.0	12.0	11.2	9.8	7.9	7.1	7.3	8.5	8.6	9.0	9.8	10.6	11.3	11.5	11.1	9.5	9.2	9.8	9.6	10.6	11.4	11.4	10.1	9.2	8.5	9.1
5.6	5.4	7.1	9.0	10.4	10.9	10.6	11.4	12.4	11.3	12.9	12.2	10.2	8.9	7.6	8.4	9.2	7.3	7.3	7.7	8.7	7.2	5.3	3.3	4.3	4.8	3.7	3.9	4.1	4.0	3.9	2.9	3.5	4.7	8.5	6.1
8.6	9.1	10.0	8.8	8.0	8.1	9.9	10.4	10.0	7.8	7.2	7.8	8.0	7.0	6.5	5.4	4.8	4.7	4.6	4.0	3.6	3.7	3.8	3.6	3.4	3.6	3.8	3.4	3.7	3.5	3.5	3.8	5.4	8.0	9.9	8.9

Figure 58. ATOVS MEAN O-B brightness temperature differences (deg C). APRIL 2003
Channel: HIRS15 (700 hPa)
NOAA17, using all observations



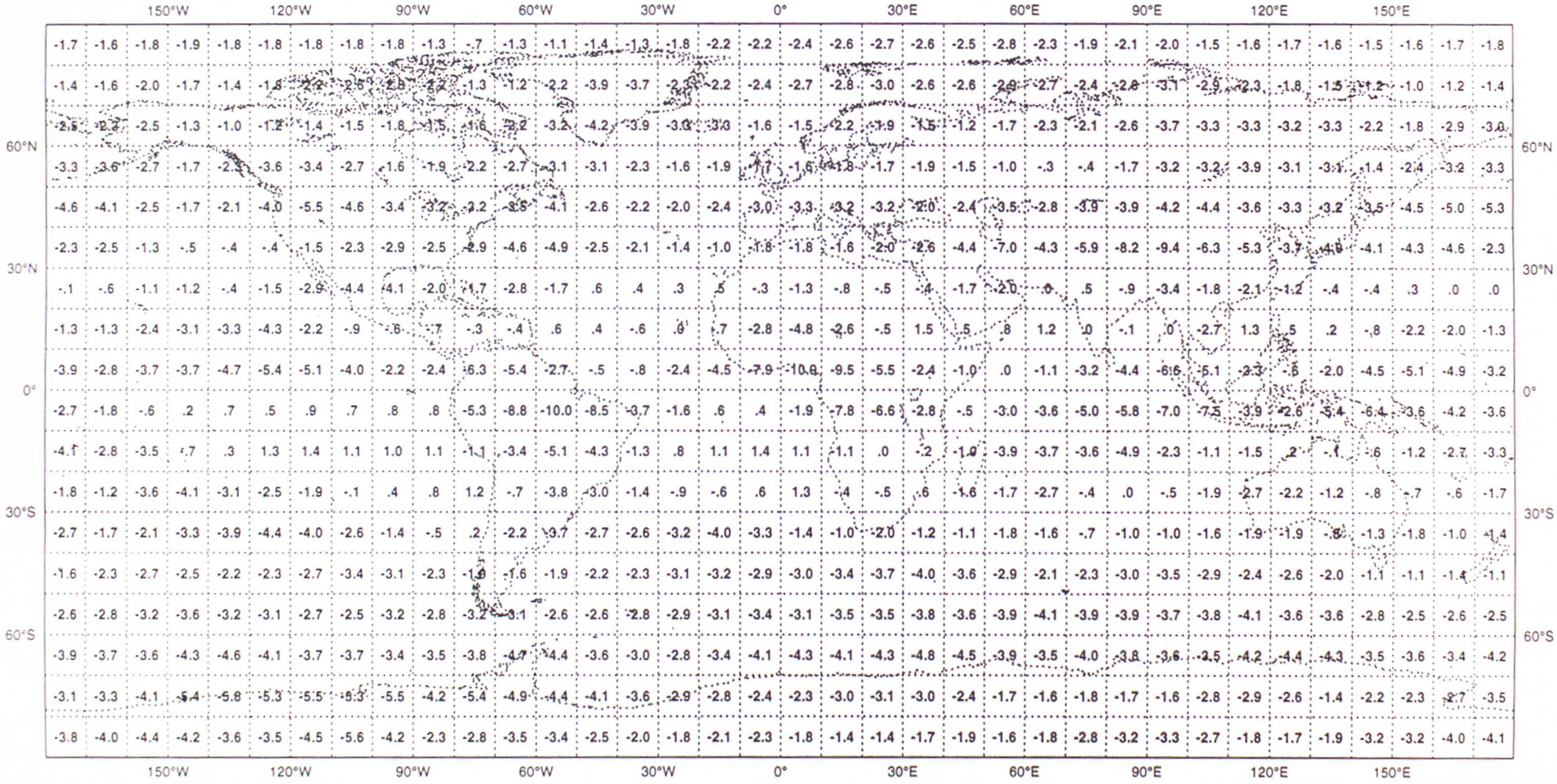
-.5	-.5	-.6	-.6	-.6	-.5	-.5	-.5	-.5	-.2	.2	-.1	.0	-.2	-.2	-.4	-.7	-.9	-1.1	-1.3	-1.3	-1.2	-1.2	-1.3	-.9	-.7	-.7	-.7	-.4	-.4	-.4	-.4	-.4	-.4	-.5	-.5
-.6	-.7	-1.0	-.8	-.6	-.7	-.7	-.9	-1.0	-.5	-.1	-.1	-.7	-1.5	-1.3	-.9	-1.3	-1.6	-2.1	-2.1	-2.0	-1.8	-1.7	-1.2	-1.5	-1.3	-1.4	-1.5	-1.2	-.9	-.6	-.6	-.4	-.4	-.5	-.6
-1.6	-1.6	-1.9	-.9	-.6	-.9	-1.2	-.9	-.7	-.5	-.6	-1.1	-2.1	-2.3	-3.1	-3.5	-3.6	-2.2	-2.0	-2.0	-1.7	-1.6	-1.3	-1.7	-2.0	-1.8	-1.9	-2.3	-2.1	-2.1	-2.0	-1.9	-1.1	-1.1	-1.8	-1.8
-3.0	-3.6	-2.7	-2.0	-2.2	-3.4	-3.4	-2.9	-1.5	-1.4	-1.5	-2.0	-2.8	-3.3	-2.9	-2.7	-3.0	-2.5	-2.2	-2.0	-2.0	-2.7	-2.6	-2.1	-1.6	-1.4	-2.1	-2.8	-3.0	-3.0	-2.5	-2.3	-1.2	-1.9	-2.7	-2.9
-5.1	-4.7	-3.4	-2.8	-2.8	-4.4	-5.1	-4.2	-3.4	-3.2	-3.4	-3.7	-4.2	-3.7	-3.8	-3.5	-3.7	-3.8	-3.6	-3.4	-3.2	-2.8	-3.1	-4.3	-3.5	-4.3	-3.7	-3.5	-3.7	-3.5	-3.5	-3.4	-3.7	-4.4	-5.1	-5.6
-3.7	-3.9	-2.9	-2.3	-2.3	-1.8	-1.3	-2.2	-3.2	-3.5	-4.0	-6.1	-6.3	-4.4	-3.9	-3.2	-2.6	-2.3	-2.2	-2.3	-2.8	-8.1	-4.6	-5.8	-3.3	-5.2	-7.2	-8.2	-6.0	-6.5	-4.8	-5.2	-5.8	-6.3	-6.1	-3.9
-1.5	-2.2	-2.8	-2.8	-2.3	-3.2	-4.3	-5.1	-5.1	-3.4	-3.4	-5.1	-3.8	-1.2	-1.4	-1.5	-1.1	-1.5	-1.8	-1.4	-1.3	-1.1	-2.8	-3.0	-.4	-.5	-2.2	-5.5	-3.4	-4.6	-3.7	-2.4	-2.5	-1.8	-1.8	-1.8
-3.3	-3.7	-4.7	-5.0	-5.2	-6.4	-3.9	-2.1	-1.5	-1.9	-2.2	-2.8	-1.4	-1.2	-2.2	-1.7	-2.0	-3.6	-4.5	-2.5	-.6	.2	-.8	-.6	-.2	-1.1	-1.1	-1.2	-3.5	-.5	-1.3	-1.8	-2.8	-3.6	-3.3	-2.9
-5.9	-5.0	-5.9	-5.3	-6.2	-7.0	-6.5	-5.2	-3.6	-4.1	-8.3	-6.7	-4.6	-3.2	-3.0	-4.2	-5.6	-7.5	-9.8	-9.4	-7.2	-4.8	-2.6	-1.7	-2.7	-4.5	-5.2	-6.5	-5.1	-4.2	-2.3	-3.6	-6.0	-6.1	-6.5	-5.3
-3.6	-2.7	-1.9	-1.4	-1.2	-1.4	-1.0	-1.0	-.8	-1.1	-7.9	-9.6	-9.1	-7.2	-5.0	-3.3	-1.6	-1.6	-3.8	-8.4	-7.7	-4.0	-2.4	-4.4	-4.9	-6.3	-6.9	-7.8	-7.7	-5.1	-4.3	-6.6	-7.5	-4.8	-5.1	-5.0
-5.1	-4.1	-5.3	-2.5	-1.8	-.7	-.6	-.9	-1.1	-.9	-2.5	-4.4	-5.5	-3.6	-2.6	-.9	-.6	-.3	-.5	-2.4	-1.9	-1.5	-2.0	-5.1	-5.0	-4.8	-5.9	-3.9	-2.9	-3.1	-.8	-.9	-1.9	-2.7	-3.9	-4.4
-3.6	-3.2	-5.8	-6.1	-5.0	-4.4	-3.6	-2.1	-1.6	-1.1	-.7	-1.1	-4.8	-4.7	-3.3	-2.7	-2.3	-1.3	-.6	-1.9	-1.6	-1.0	-3.0	-4.1	-5.0	-2.5	-2.2	-2.3	-3.8	-4.0	-3.1	-1.5	-1.3	-2.3	-2.5	-3.6
-5.1	-3.9	-3.9	-5.1	-6.2	-6.5	-6.0	-5.0	-3.6	-2.3	-1.4	-2.9	-4.9	-4.5	-4.5	-5.2	-5.8	-5.1	-3.5	-2.9	-3.9	-3.1	-2.7	-3.9	-3.8	-2.8	-3.3	-3.1	-3.5	-3.6	-3.4	-2.2	-2.4	-3.8	-2.9	-3.4
-3.7	-4.2	-4.4	-3.9	-3.9	-3.8	-4.1	-4.7	-4.5	-4.2	-3.2	-2.5	-3.3	-3.8	-3.7	-4.4	-4.1	-3.9	-4.3	-4.6	-4.9	-5.1	-4.7	-4.2	-3.5	-3.7	-4.5	-4.8	-4.2	-3.8	-4.1	-3.4	-2.7	-3.1	-3.4	-2.8
-3.6	-3.5	-3.7	-4.3	-3.9	-3.8	-3.3	-3.4	-4.1	-3.9	-4.3	-3.9	-3.3	-3.3	-3.1	-3.1	-3.2	-3.3	-2.9	-3.3	-3.6	-4.1	-3.9	-4.2	-4.3	-3.9	-3.8	-3.6	-3.8	-4.5	-4.5	-4.4	-3.8	-3.6	-3.9	-3.7
-3.2	-3.0	-2.9	-3.5	-4.1	-3.7	-3.6	-3.6	-3.6	-3.8	-3.9	-4.8	-3.4	-2.7	-2.1	-2.0	-2.6	-3.2	-3.3	-3.2	-3.4	-3.8	-3.6	-2.9	-2.6	-2.9	-2.6	-2.4	-2.3	-3.1	-3.4	-3.2	-2.6	-2.6	-2.6	-3.3
-1.2	-1.4	-2.1	-3.1	-3.5	-3.4	-3.7	-3.8	-3.8	-2.8	-3.5	-2.7	-2.5	-2.2	-1.7	-1.3	-1.0	-.6	-.7	-.9	-1.2	-.9	-.4	.1	.0	-.2	.0	-.2	-.3	-.2	-.2	.2	.0	-.1	-.8	-1.3
-1.1	-1.2	-1.3	-1.3	-1.2	-1.3	-1.9	-2.5	-1.8	-.5	-.7	-1.0	-1.0	-.6	-.2	.1	.1	.1	.3	.4	.4	.4	.3	.4	.5	.2	.0	-.1	.0	.2	.3	.1	-.4	-.8	-1.3	-1.3

Figure 59. ATOVS SD O-B brightness temperature differences (deg C). APRIL 2003
Channel: HIRS15 (700 hPa)
NOAA17, using all observations



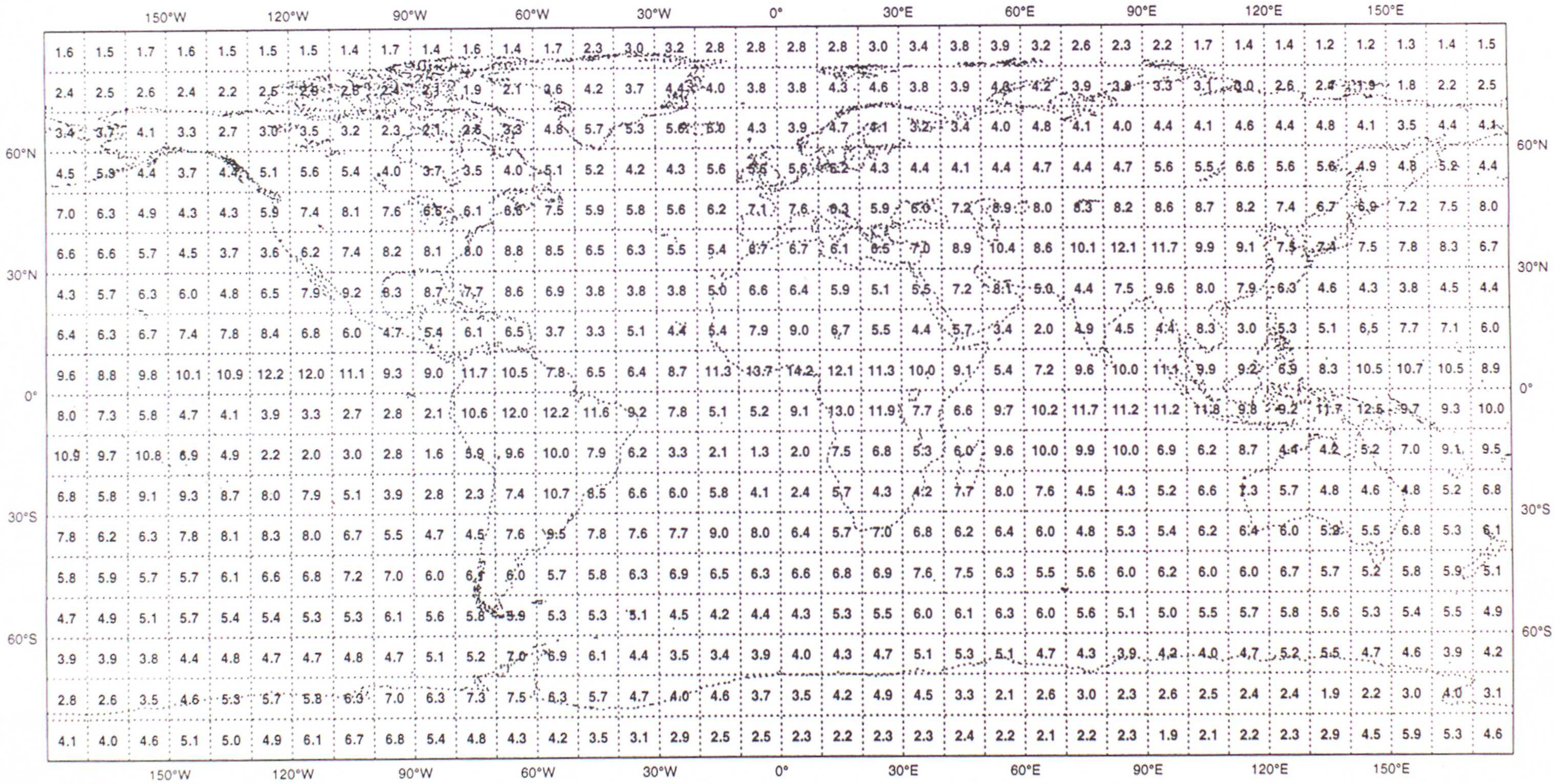
.8	.8	.9	.9	.8	.7	.7	.6	.8	.7	.8	.7	.8	1.2	1.7	1.8	1.8	1.9	1.8	1.7	2.0	2.4	2.6	2.5	1.9	1.5	1.3	1.2	.7	.6	.6	.6	.5	.6	.7	.8
1.4	1.6	1.8	1.6	1.3	1.4	1.6	1.5	1.3	1.2	.9	1.1	2.2	2.7	2.4	2.8	2.9	2.7	2.6	2.9	3.0	2.5	2.5	2.8	2.7	2.6	2.6	2.1	1.8	1.6	1.3	1.2	1.0	.9	1.2	1.5
2.4	2.7	3.2	2.4	1.8	1.9	2.2	2.1	1.5	1.4	1.6	2.2	3.3	3.8	4.0	4.8	4.5	3.2	3.1	3.4	2.8	2.2	2.2	2.7	3.2	2.9	2.7	2.8	2.7	3.0	2.7	2.6	2.3	2.1	2.7	2.6
3.6	4.9	3.6	3.1	3.8	4.0	4.3	4.4	3.1	3.0	2.9	3.2	4.1	4.2	3.6	3.4	4.5	4.6	4.6	4.2	3.5	3.4	3.2	3.4	3.8	3.7	3.7	4.0	4.0	4.4	3.8	3.6	3.1	3.4	3.9	3.5
5.7	5.5	4.3	3.8	3.7	4.7	6.2	6.6	6.3	5.6	5.2	6.7	6.4	5.2	5.1	4.8	5.2	6.0	6.5	5.3	4.9	5.0	5.8	7.2	6.7	6.9	6.7	6.9	7.0	6.5	6.0	6.5	5.7	6.1	6.4	6.9
5.7	5.8	4.9	3.8	3.2	3.2	5.3	6.7	7.0	6.9	7.2	8.7	7.9	5.8	5.5	4.8	4.6	6.0	5.8	5.4	6.0	6.5	7.9	9.3	7.6	8.6	9.5	9.8	8.3	8.2	6.8	6.8	6.9	7.4	7.2	5.7
3.3	4.7	5.1	4.7	3.6	5.3	7.3	8.6	7.7	7.5	7.1	8.4	6.6	2.9	3.1	3.0	4.2	5.5	5.9	5.1	4.0	4.6	7.1	8.0	4.4	3.9	6.5	8.4	7.0	7.3	6.2	4.5	4.4	3.7	3.8	3.6
5.6	5.8	6.3	6.7	6.6	7.7	5.9	4.8	3.8	4.0	4.7	5.4	2.9	2.6	4.4	3.6	4.5	6.7	8.0	5.6	3.9	3.7	5.1	2.8	1.2	4.1	3.5	3.5	6.6	2.2	4.1	4.0	5.2	5.8	5.5	4.9
8.7	8.2	9.2	9.0	9.8	10.9	10.7	9.5	7.6	7.6	9.8	9.0	6.9	5.9	5.9	8.0	9.5	11.0	11.4	10.5	9.5	8.6	7.5	4.6	6.1	8.3	8.8	9.5	8.0	7.5	5.7	7.0	9.3	9.0	9.4	8.1
7.0	6.0	5.0	3.7	3.3	3.5	2.7	2.0	2.2	2.2	9.1	10.6	10.5	9.9	8.4	6.9	4.0	4.0	7.5	10.9	9.8	6.7	5.6	8.8	9.2	10.3	10.2	10.0	10.1	8.0	7.9	10.1	10.6	8.4	8.3	8.8
9.5	8.1	9.6	6.0	4.4	1.9	1.5	2.0	1.8	1.0	5.5	8.1	8.5	6.5	5.1	2.2	1.3	.6	1.1	6.6	5.9	4.1	5.0	8.7	8.6	8.2	8.6	6.1	5.3	7.2	3.9	3.2	3.9	5.5	7.6	8.0
6.6	5.6	8.9	9.0	8.4	7.9	7.3	4.6	3.6	2.2	1.7	6.0	9.3	7.8	6.3	5.5	5.3	3.8	1.7	5.8	4.5	3.4	7.0	7.3	7.6	4.5	4.1	4.4	6.2	1.0	5.9	5.0	4.8	4.6	5.0	6.4
7.6	5.8	5.6	7.4	7.8	8.1	7.7	6.4	5.2	4.2	3.7	6.5	8.7	7.2	7.1	7.3	8.3	7.2	5.6	5.4	6.8	6.3	5.8	6.3	5.8	4.5	5.0	4.9	5.9	6.1	5.5	4.9	5.6	6.6	5.3	5.6
5.6	5.5	5.2	5.1	5.5	5.9	6.0	6.3	6.1	5.2	5.2	5.0	5.0	5.1	5.6	6.1	5.4	5.4	5.6	5.9	6.0	6.6	6.6	5.6	4.8	4.6	5.1	5.4	5.2	5.4	5.8	4.9	4.6	5.1	5.4	4.6
3.8	3.8	4.3	4.8	4.6	4.4	4.3	4.3	4.9	4.7	4.7	4.8	4.0	4.1	3.8	3.2	3.1	3.4	3.4	4.2	4.3	4.9	5.1	5.2	5.1	4.6	4.1	4.2	4.5	4.7	4.9	4.8	4.5	4.7	4.6	4.2
3.2	3.1	2.9	3.4	3.9	3.8	3.7	3.8	3.8	4.0	4.0	4.9	4.8	4.2	2.9	2.3	2.3	2.8	2.8	2.9	3.2	3.6	3.9	4.0	3.7	3.2	2.8	3.0	2.9	3.6	4.1	4.4	3.8	3.7	3.1	3.5
1.7	1.7	2.4	3.0	3.6	4.0	4.1	4.7	5.2	4.6	5.3	5.1	4.4	3.8	3.0	2.3	2.7	2.0	1.8	2.3	2.7	2.5	1.7	.8	1.2	1.4	1.0	1.2	1.1	1.1	1.1	.8	.9	1.4	2.0	1.7
2.1	2.2	2.6	3.1	2.9	3.0	4.0	4.4	4.3	3.3	2.9	2.5	2.5	2.0	1.6	1.3	1.0	.8	.7	.6	.7	.7	.6	.6	.6	.7	.7	.6	.6	.7	.9	1.5	2.5	3.1	2.9	2.6

Figure 60. ATOVS MEAN O-B brightness temperature differences (deg C). APRIL 2003
Channel: HIRS11 (500 - 700 hPa)
NOAA17, using all observations



-1.7	-1.6	-1.8	-1.9	-1.8	-1.8	-1.8	-1.8	-1.8	-1.3	-.7	-1.3	-1.1	-1.4	-1.3	-1.8	-2.2	-2.2	-2.4	-2.6	-2.7	-2.6	-2.5	-2.8	-2.3	-1.9	-2.1	-2.0	-1.5	-1.6	-1.7	-1.6	-1.5	-1.6	-1.7	-1.8
-1.4	-1.6	-2.0	-1.7	-1.4	-1.8	-2.2	-2.5	-2.8	-2.2	-1.3	-1.2	-2.2	-3.9	-3.7	-2.3	-2.2	-2.4	-2.7	-2.8	-3.0	-2.6	-2.6	-2.8	-2.7	-2.4	-2.8	-3.1	-2.9	-2.3	-1.8	-1.5	-1.2	-1.0	-1.2	-1.4
-2.5	-2.2	-2.5	-1.3	-1.0	-1.2	-1.4	-1.5	-1.8	-1.5	-1.6	-2.2	-3.2	-4.2	-3.9	-3.0	-3.3	-1.6	-1.5	-2.2	-1.9	-1.5	-1.2	-1.7	-2.3	-2.1	-2.6	-3.7	-3.3	-3.3	-3.2	-3.3	-2.2	-1.8	-2.9	-3.0
-3.3	-3.6	-2.7	-1.7	-2.3	-3.6	-3.4	-2.7	-1.6	-1.9	-2.2	-2.7	-3.1	-3.1	-2.3	-1.6	-1.9	-1.7	-1.6	-1.8	-1.7	-1.9	-1.5	-1.0	-.3	-.4	-1.7	-3.2	-3.2	-3.9	-3.1	-3.1	-1.4	-2.4	-3.2	-3.3
-4.6	-4.1	-2.5	-1.7	-2.1	-4.0	-5.5	-4.6	-3.4	-3.2	-3.2	-3.5	-4.1	-2.6	-2.2	-2.0	-2.4	-3.0	-3.3	-3.2	-3.2	-2.0	-2.4	-3.5	-2.8	-3.9	-3.9	-4.2	-4.4	-3.6	-3.3	-3.2	-3.5	-4.5	-5.0	-5.3
-2.3	-2.5	-1.3	-.5	-.4	-.4	-1.5	-2.3	-2.9	-2.5	-2.9	-4.6	-4.9	-2.5	-2.1	-1.4	-1.0	-1.8	-1.8	-1.6	-2.0	-2.6	-4.4	-7.0	-4.3	-5.9	-8.2	-9.4	-6.3	-5.3	-3.7	-4.0	-4.1	-4.3	-4.6	-2.3
-.1	-.6	-1.1	-1.2	-.4	-1.5	-2.9	-4.4	-4.1	-2.0	-1.7	-2.8	-1.7	.6	.4	.3	.5	-.3	-1.3	-.8	-.5	-.4	-1.7	-2.0	.0	.5	-.9	-3.4	-1.8	-2.1	-1.2	-.4	-.4	.3	.0	.0
-1.3	-1.3	-2.4	-3.1	-3.3	-4.3	-2.2	-.9	-.6	-.7	-.3	-.4	.6	.4	-.6	.0	.7	-2.8	-4.8	-2.6	-.5	1.5	.5	.8	1.2	.0	-.1	.0	-2.7	1.3	.5	.2	-.8	-2.2	-2.0	-1.3
-3.9	-2.8	-3.7	-3.7	-4.7	-5.4	-5.1	-4.0	-2.2	-2.4	-6.3	-5.4	-2.7	-.5	-.8	-2.4	-4.5	-7.9	-10.0	-9.5	-5.5	-2.4	-1.0	.0	-1.1	-3.2	-4.4	-6.6	-5.1	-2.3	-.6	-2.0	-4.5	-5.1	-4.9	-3.2
-2.7	-1.8	-.6	.2	.7	.5	.9	.7	.8	.8	-5.3	-8.8	-10.0	-8.5	-3.7	-1.6	.6	.4	-1.9	-7.8	-6.6	-2.8	-.5	-3.0	-3.6	-5.0	-5.8	-7.0	-7.5	-3.9	-2.6	-5.4	-6.4	-3.6	-4.2	-3.6
-4.1	-2.8	-3.5	.7	.3	1.3	1.4	1.1	1.0	1.1	-1.1	-3.4	-5.1	-4.3	-1.3	.8	1.1	1.4	1.1	-1.1	.0	-.2	-1.0	-3.9	-3.7	-3.6	-4.9	-2.3	-1.1	-1.5	.2	-.1	-.6	-1.2	-2.7	-3.3
-1.8	-1.2	-3.6	-4.1	-3.1	-2.5	-1.9	-.1	.4	.8	1.2	-.7	-3.8	-3.0	-1.4	-.9	-.6	.6	1.3	-.4	-.5	.6	-1.6	-1.7	-2.7	-.4	.0	-.5	-1.9	-2.7	-2.2	-1.2	-.8	-.7	-.6	-1.7
-2.7	-1.7	-2.1	-3.3	-3.9	-4.4	-4.0	-2.6	-1.4	-.5	.2	-2.2	-3.7	-2.7	-2.6	-3.2	-4.0	-3.3	-1.4	-1.0	-2.0	-1.2	-1.1	-1.8	-1.6	-.7	-1.0	-1.0	-1.6	-1.9	-1.9	-.8	-1.3	-1.8	-1.0	-1.4
-1.6	-2.3	-2.7	-2.5	-2.2	-2.3	-2.7	-3.4	-3.1	-2.3	-1.9	-1.6	-1.9	-2.2	-2.3	-3.1	-3.2	-2.9	-3.0	-3.4	-3.7	-4.0	-3.6	-2.9	-2.1	-2.3	-3.0	-3.5	-2.9	-2.4	-2.6	-2.0	-1.1	-1.1	-1.4	-1.1
-2.6	-2.8	-3.2	-3.6	-3.2	-3.1	-2.7	-2.5	-3.2	-2.8	-3.2	-3.1	-2.6	-2.6	-2.8	-2.9	-3.1	-3.4	-3.1	-3.5	-3.5	-3.8	-3.6	-3.9	-4.1	-3.9	-3.9	-3.7	-3.8	-4.1	-3.6	-3.6	-2.8	-2.5	-2.6	-2.5
-3.9	-3.7	-3.6	-4.3	-4.6	-4.1	-3.7	-3.7	-3.4	-3.5	-3.8	-4.7	-4.4	-3.6	-3.0	-2.8	-3.4	-4.1	-4.3	-4.1	-4.3	-4.8	-4.5	-3.9	-3.5	-4.0	-3.8	-3.6	-2.5	-4.2	-4.4	-4.3	-3.5	-3.6	-3.4	-4.2
-3.1	-3.3	-4.1	-5.4	-5.8	-5.3	-5.5	-5.3	-5.5	-4.2	-5.4	-4.9	-4.4	-4.1	-3.6	-2.9	-2.8	-2.4	-2.3	-3.0	-3.1	-3.0	-2.4	-1.7	-1.6	-1.8	-1.7	-1.6	-2.8	-2.9	-2.6	-1.4	-2.2	-2.3	-2.7	-3.5
-3.8	-4.0	-4.4	-4.2	-3.6	-3.5	-4.5	-5.6	-4.2	-2.3	-2.8	-3.5	-3.4	-2.5	-2.0	-1.8	-2.1	-2.3	-1.8	-1.4	-1.4	-1.7	-1.9	-1.6	-1.8	-2.8	-3.2	-3.3	-2.7	-1.8	-1.7	-1.9	-3.2	-3.2	-4.0	-4.1

Figure 61. ATOVS SD O-B brightness temperature differences (deg C). APRIL 2003
Channel: HIRS11 (500 - 700 hPa)
NOAA17, using all observations



1.6	1.5	1.7	1.6	1.5	1.5	1.5	1.4	1.7	1.4	1.6	1.4	1.7	2.3	3.0	3.2	2.8	2.8	2.8	2.8	3.0	3.4	3.8	3.9	3.2	2.6	2.3	2.2	1.7	1.4	1.4	1.2	1.2	1.3	1.4	1.5
2.4	2.5	2.6	2.4	2.2	2.5	2.8	2.8	2.4	2.1	1.9	2.1	3.6	4.2	3.7	4.4	4.0	3.8	3.8	4.3	4.6	3.8	3.9	4.8	4.2	3.9	3.8	3.3	3.1	3.0	2.6	2.4	1.9	1.8	2.2	2.5
3.4	3.7	4.1	3.3	2.7	3.0	3.5	3.2	2.3	2.1	2.8	3.3	4.8	5.7	5.3	5.6	5.0	4.3	3.9	4.7	4.1	3.2	3.4	4.0	4.8	4.1	4.0	4.4	4.1	4.6	4.4	4.8	4.1	3.5	4.4	4.1
4.5	5.9	4.4	3.7	4.4	5.1	5.6	5.4	4.0	3.7	3.5	4.0	5.1	5.2	4.2	4.3	5.6	5.6	5.6	6.2	4.3	4.4	4.1	4.4	4.7	4.4	4.7	5.6	5.5	6.6	5.6	5.6	4.9	4.8	5.2	4.4
7.0	6.3	4.9	4.3	4.3	5.9	7.4	8.1	7.6	6.5	6.1	6.6	7.5	5.9	5.8	5.6	6.2	7.1	7.6	9.3	5.9	6.0	7.2	8.9	8.0	8.3	8.2	8.6	8.7	8.2	7.4	6.7	6.9	7.2	7.5	8.0
6.6	6.6	5.7	4.5	3.7	3.6	6.2	7.4	8.2	8.1	8.0	8.8	8.5	6.5	6.3	5.5	5.4	8.7	6.7	6.1	6.5	7.0	8.9	10.4	8.6	10.1	12.1	11.7	9.9	9.1	7.5	7.4	7.5	7.8	8.3	6.7
4.3	5.7	6.3	6.0	4.8	6.5	7.9	9.2	8.3	8.7	7.7	8.6	6.9	3.8	3.8	3.8	5.0	6.6	6.4	5.9	5.1	5.5	7.2	8.1	5.0	4.4	7.5	9.6	8.0	7.9	6.3	4.6	4.3	3.8	4.5	4.4
6.4	6.3	6.7	7.4	7.8	8.4	6.8	6.0	4.7	5.4	6.1	6.5	3.7	3.3	5.1	4.4	5.4	7.9	9.0	6.7	5.5	4.4	5.7	3.4	2.0	4.9	4.5	4.4	8.3	3.0	5.3	5.1	6.5	7.7	7.1	6.0
9.6	8.8	9.8	10.1	10.9	12.2	12.0	11.1	9.3	9.0	11.7	10.5	7.8	6.5	6.4	8.7	11.3	13.7	14.2	12.1	11.3	10.0	9.1	5.4	7.2	9.6	10.0	11.1	9.9	9.2	6.9	8.3	10.5	10.7	10.5	8.9
8.0	7.3	5.8	4.7	4.1	3.9	3.3	2.7	2.8	2.1	10.6	12.0	12.2	11.6	9.2	7.8	5.1	5.2	9.1	13.0	11.9	7.7	6.6	9.7	10.2	11.7	11.2	11.2	11.8	9.8	9.2	11.7	12.5	9.7	9.3	10.0
10.9	9.7	10.8	6.9	4.9	2.2	2.0	3.0	2.8	1.6	5.9	9.6	10.0	7.9	6.2	3.3	2.1	1.3	2.0	7.5	6.8	5.3	6.0	9.6	10.0	9.9	10.0	6.9	6.2	8.7	4.4	4.2	5.2	7.0	9.1	9.5
6.8	5.8	9.1	9.3	8.7	8.0	7.9	5.1	3.9	2.8	2.3	7.4	10.7	8.5	6.6	6.0	5.8	4.1	2.4	5.7	4.3	4.2	7.7	8.0	7.6	4.5	4.3	5.2	6.6	7.3	5.7	4.8	4.6	4.8	5.2	6.8
7.8	6.2	6.3	7.8	8.1	8.3	8.0	6.7	5.5	4.7	4.5	7.6	9.5	7.8	7.6	7.7	9.0	8.0	6.4	5.7	7.0	6.8	6.2	6.4	6.0	4.8	5.3	5.4	6.2	6.4	6.0	5.8	5.5	6.8	5.3	6.1
5.8	5.9	5.7	5.7	6.1	6.6	6.8	7.2	7.0	6.0	6.1	6.0	5.7	5.8	6.3	6.9	6.5	6.3	6.6	6.8	6.9	7.6	7.5	6.3	5.5	5.6	6.0	6.2	6.0	6.0	6.7	5.7	5.2	5.8	5.9	5.1
4.7	4.9	5.1	5.7	5.4	5.4	5.3	5.3	6.1	5.6	5.8	5.9	5.3	5.3	5.1	4.5	4.2	4.4	4.3	5.3	5.5	6.0	6.1	6.3	6.0	5.6	5.1	5.0	5.5	5.7	5.8	5.6	5.3	5.4	5.5	4.9
3.9	3.9	3.8	4.4	4.8	4.7	4.7	4.8	4.7	5.1	5.2	7.0	6.9	6.1	4.4	3.5	3.4	3.9	4.0	4.3	4.7	5.1	5.3	5.1	4.7	4.3	3.9	4.2	4.0	4.7	5.2	5.5	4.7	4.6	3.9	4.2
2.8	2.6	3.5	4.6	5.3	5.7	5.8	6.3	7.0	6.3	7.3	7.5	6.3	5.7	4.7	4.0	4.6	3.7	3.5	4.2	4.9	4.5	3.3	2.1	2.6	3.0	2.3	2.6	2.5	2.4	2.4	1.9	2.2	3.0	4.0	3.1
4.1	4.0	4.6	5.1	5.0	4.9	6.1	6.7	6.8	5.4	4.8	4.3	4.2	3.5	3.1	2.9	2.5	2.5	2.3	2.2	2.3	2.3	2.4	2.2	2.1	2.2	2.3	1.9	2.1	2.2	2.3	2.9	4.5	5.9	5.3	4.6

Figure 62. ATOVS MEAN O-B brightness temperature differences (deg C). APRIL 2003
Channel: HIRS4 (400 hPa)
NOAA17, using all observations

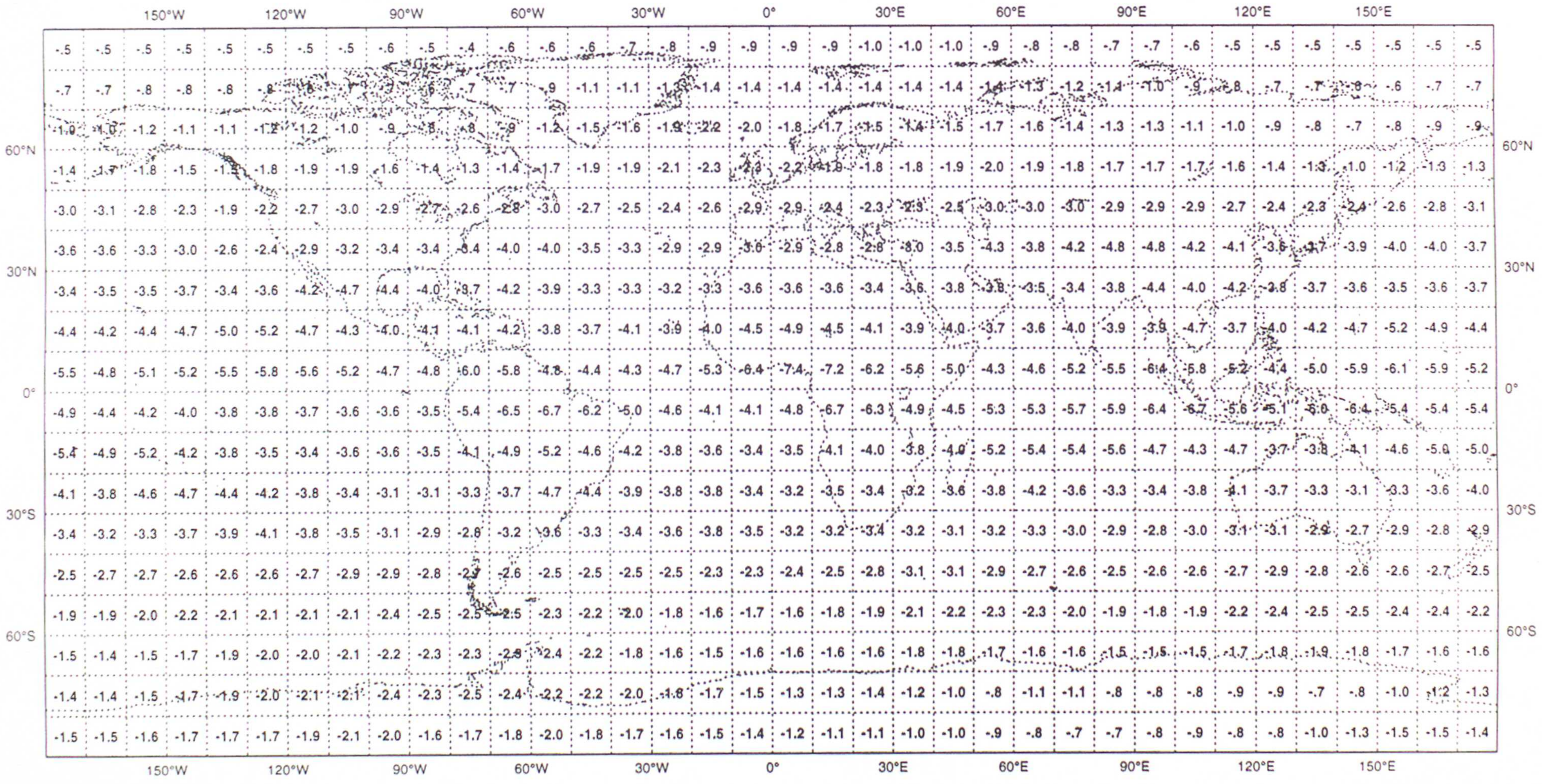
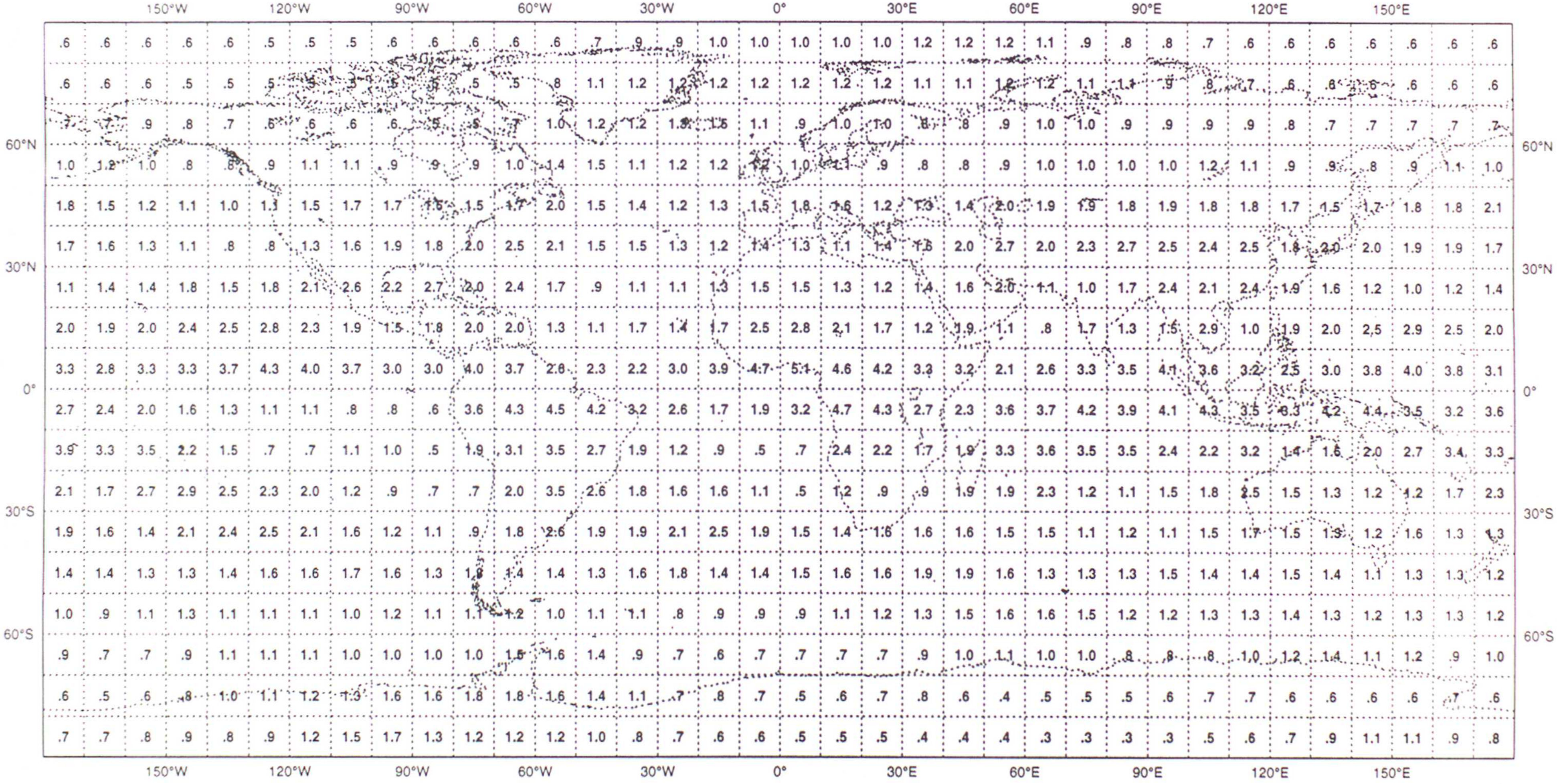

150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S
-.5 -.5 -.5 -.5 -.5 -.5 -.5 -.5 -.6 -.5 -.4 -.6 -.6 -.6 -.7 -.8 -.9 -.9 -.9 -.9 -1.0 -1.0 -1.0 -.9 -.8 -.8 -.7 -.7 -.6 -.5 -.5 -.5 -.5 -.5 -.5 -.5
-.7 -.7 -.8 -.8 -.8 -.8 -.8 -.7 -.7 -.6 -.7 -.7 -.9 -1.1 -1.1 -1.3 -1.4 -1.4 -1.4 -1.4 -1.4 -1.4 -1.4 -1.4 -1.3 -1.2 -1.4 -1.0 -.9 -.8 -.7 -.7 -.8 -.6 -.7 -.7
-1.0 -1.0 -1.2 -1.1 -1.1 -1.2 -1.2 -1.0 -.9 -.8 -.8 -.9 -1.2 -1.5 -1.6 -1.9 -2.2 -2.0 -1.8 -1.7 -1.5 -1.4 -1.5 -1.7 -1.6 -1.4 -1.3 -1.3 -1.1 -1.0 -.9 -.8 -.7 -.8 -.9 -.9
-1.4 -1.7 -1.8 -1.5 -1.5 -1.8 -1.9 -1.9 -1.6 -1.4 -1.3 -1.4 -1.7 -1.9 -1.9 -2.1 -2.3 -2.3 -2.2 -1.9 -1.8 -1.8 -1.9 -2.0 -1.9 -1.8 -1.7 -1.7 -1.7 -1.6 -1.4 -1.3 -1.0 -1.2 -1.3 -1.3
-3.0 -3.1 -2.8 -2.3 -1.9 -2.2 -2.7 -3.0 -2.9 -2.7 -2.6 -2.8 -3.0 -2.7 -2.5 -2.4 -2.6 -2.9 -2.9 -2.4 -2.3 -2.3 -2.5 -3.0 -3.0 -3.0 -2.9 -2.9 -2.9 -2.7 -2.4 -2.3 -2.4 -2.6 -2.8 -3.1
-3.6 -3.6 -3.3 -3.0 -2.6 -2.4 -2.9 -3.2 -3.4 -3.4 -3.4 -4.0 -4.0 -3.5 -3.3 -2.9 -2.9 -3.0 -2.9 -2.8 -2.8 -3.0 -3.5 -4.3 -3.8 -4.2 -4.8 -4.8 -4.2 -4.1 -3.6 -3.7 -3.9 -4.0 -4.0 -3.7
-3.4 -3.5 -3.5 -3.7 -3.4 -3.6 -4.2 -4.7 -4.4 -4.0 -3.7 -4.2 -3.9 -3.3 -3.3 -3.2 -3.3 -3.6 -3.6 -3.6 -3.4 -3.6 -3.8 -3.8 -3.5 -3.4 -3.8 -4.4 -4.0 -4.2 -3.8 -3.7 -3.6 -3.5 -3.6 -3.7
-4.4 -4.2 -4.4 -4.7 -5.0 -5.2 -4.7 -4.3 -4.0 -4.1 -4.1 -4.2 -3.8 -3.7 -4.1 -3.9 -4.0 -4.5 -4.9 -4.5 -4.1 -3.9 -4.0 -3.7 -3.6 -4.0 -3.9 -3.9 -4.7 -3.7 -4.0 -4.2 -4.7 -5.2 -4.9 -4.4
-5.5 -4.8 -5.1 -5.2 -5.5 -5.8 -5.6 -5.2 -4.7 -4.8 -6.0 -5.8 -4.8 -4.4 -4.3 -4.7 -5.3 -6.4 -7.4 -7.2 -6.2 -5.6 -5.0 -4.3 -4.6 -5.2 -5.5 -6.4 -5.8 -5.2 -4.4 -5.0 -5.9 -6.1 -5.9 -5.2
-4.9 -4.4 -4.2 -4.0 -3.8 -3.8 -3.7 -3.6 -3.6 -3.5 -5.4 -6.5 -6.7 -6.2 -5.0 -4.6 -4.1 -4.1 -4.8 -6.7 -6.3 -4.9 -4.5 -5.3 -5.3 -5.7 -5.9 -6.4 -6.7 -5.6 -5.1 -6.0 -6.4 -5.4 -5.4 -5.4
-5.4 -4.9 -5.2 -4.2 -3.8 -3.5 -3.4 -3.6 -3.6 -3.5 -4.1 -4.9 -5.2 -4.6 -4.2 -3.8 -3.6 -3.4 -3.5 -4.1 -4.0 -3.8 -4.0 -5.2 -5.4 -5.4 -5.6 -4.7 -4.3 -4.7 -3.7 -3.8 -4.1 -4.6 -5.0 -5.0
-4.1 -3.8 -4.6 -4.7 -4.4 -4.2 -3.8 -3.4 -3.1 -3.1 -3.3 -3.7 -4.7 -4.4 -3.9 -3.8 -3.8 -3.4 -3.2 -3.5 -3.4 -3.2 -3.6 -3.8 -4.2 -3.6 -3.3 -3.4 -3.8 -4.1 -3.7 -3.3 -3.1 -3.3 -3.6 -4.0
-3.4 -3.2 -3.3 -3.7 -3.9 -4.1 -3.8 -3.5 -3.1 -2.9 -2.8 -3.2 -3.6 -3.3 -3.4 -3.6 -3.8 -3.5 -3.2 -3.2 -3.4 -3.2 -3.1 -3.2 -3.3 -3.0 -2.9 -2.8 -3.0 -3.1 -3.1 -2.9 -2.7 -2.9 -2.8 -2.9
-2.5 -2.7 -2.7 -2.6 -2.6 -2.6 -2.7 -2.9 -2.9 -2.8 -2.7 -2.6 -2.5 -2.5 -2.5 -2.5 -2.3 -2.3 -2.4 -2.5 -2.8 -3.1 -3.1 -2.9 -2.7 -2.6 -2.5 -2.6 -2.6 -2.7 -2.9 -2.8 -2.6 -2.6 -2.7 -2.5
-1.9 -1.9 -2.0 -2.2 -2.1 -2.1 -2.1 -2.1 -2.4 -2.5 -2.5 -2.5 -2.3 -2.2 -2.0 -1.8 -1.6 -1.7 -1.6 -1.8 -1.9 -2.1 -2.2 -2.3 -2.3 -2.0 -1.9 -1.8 -1.9 -2.2 -2.4 -2.5 -2.5 -2.4 -2.4 -2.2
-1.5 -1.4 -1.5 -1.7 -1.9 -2.0 -2.0 -2.1 -2.2 -2.3 -2.3 -2.3 -2.4 -2.2 -1.8 -1.6 -1.5 -1.6 -1.6 -1.6 -1.6 -1.8 -1.8 -1.7 -1.6 -1.6 -1.5 -1.5 -1.5 -1.7 -1.8 -1.9 -1.8 -1.7 -1.6 -1.6
-1.4 -1.4 -1.5 -1.7 -1.9 -2.0 -2.1 -2.1 -2.4 -2.3 -2.5 -2.4 -2.2 -2.2 -2.0 -1.8 -1.7 -1.5 -1.3 -1.3 -1.4 -1.2 -1.0 -.8 -1.1 -1.1 -.8 -.8 -.8 -.9 -.9 -.7 -.8 -1.0 -1.2 -1.3
-1.5 -1.5 -1.6 -1.7 -1.7 -1.7 -1.9 -2.1 -2.0 -1.6 -1.7 -1.8 -2.0 -1.8 -1.7 -1.6 -1.5 -1.4 -1.2 -1.1 -1.1 -1.0 -1.0 -.9 -.8 -.7 -.7 -.8 -.9 -.8 -.8 -1.0 -1.3 -1.5 -1.5 -1.4

Figure 63. ATOVS SD O-B brightness temperature differences (deg C). APRIL 2003
Channel: HIRS4 (400 hPa)
NOAA17, using all observations



.6	.6	.6	.6	.6	.5	.5	.5	.6	.6	.6	.6	.6	.7	.9	.9	1.0	1.0	1.0	1.0	1.0	1.2	1.2	1.2	1.1	.9	.8	.8	.7	.6	.6	.6	.6	.6	.6	.6
.6	.6	.6	.5	.5	.5	.5	.5	.5	.5	.5	.5	.8	1.1	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.1	1.1	1.2	1.2	1.1	1.1	.9	.8	.7	.6	.8	.6	.6	.6	.6
.7	.7	.9	.8	.7	.6	.6	.6	.6	.5	.5	.7	1.0	1.2	1.2	1.3	1.5	1.1	.9	1.0	1.0	.8	.8	.9	1.0	1.0	.9	.9	.9	.9	.8	.7	.7	.7	.7	.7
1.0	1.2	1.0	.8	.8	.9	1.1	1.1	.9	.9	.9	1.0	1.4	1.5	1.1	1.2	1.2	1.2	1.0	1.1	.9	.8	.8	.9	1.0	1.0	1.0	1.0	1.2	1.1	.9	.9	.8	.9	1.1	1.0
1.8	1.5	1.2	1.1	1.0	1.1	1.5	1.7	1.7	1.6	1.5	1.7	2.0	1.5	1.4	1.2	1.3	1.5	1.8	1.6	1.2	1.3	1.4	2.0	1.9	1.9	1.8	1.9	1.8	1.8	1.7	1.5	1.7	1.8	1.8	2.1
1.7	1.6	1.3	1.1	.8	.8	1.3	1.6	1.9	1.8	2.0	2.5	2.1	1.5	1.5	1.3	1.2	1.4	1.3	1.1	1.4	1.6	2.0	2.7	2.0	2.3	2.7	2.5	2.4	2.5	1.8	2.0	2.0	1.9	1.9	1.7
1.1	1.4	1.4	1.8	1.5	1.8	2.1	2.6	2.2	2.7	2.0	2.4	1.7	.9	1.1	1.1	1.3	1.5	1.5	1.3	1.2	1.4	1.6	2.0	1.1	1.0	1.7	2.4	2.1	2.4	1.9	1.6	1.2	1.0	1.2	1.4
2.0	1.9	2.0	2.4	2.5	2.8	2.3	1.9	1.5	1.8	2.0	2.0	1.3	1.1	1.7	1.4	1.7	2.5	2.8	2.1	1.7	1.2	1.9	1.1	.8	1.7	1.3	1.5	2.9	1.0	1.9	2.0	2.5	2.9	2.5	2.0
3.3	2.8	3.3	3.3	3.7	4.3	4.0	3.7	3.0	3.0	4.0	3.7	2.6	2.3	2.2	3.0	3.9	4.7	5.1	4.6	4.2	3.3	3.2	2.1	2.6	3.3	3.5	4.1	3.6	3.2	2.5	3.0	3.8	4.0	3.8	3.1
2.7	2.4	2.0	1.6	1.3	1.1	1.1	.8	.8	.6	3.6	4.3	4.5	4.2	3.2	2.6	1.7	1.9	3.2	4.7	4.3	2.7	2.3	3.6	3.7	4.2	3.9	4.1	4.3	3.5	3.3	4.2	4.4	3.5	3.2	3.6
3.9	3.3	3.5	2.2	1.5	.7	.7	1.1	1.0	.5	1.9	3.1	3.5	2.7	1.9	1.2	.9	.5	.7	2.4	2.2	1.7	1.9	3.3	3.6	3.5	3.5	2.4	2.2	3.2	1.4	1.6	2.0	2.7	3.4	3.3
2.1	1.7	2.7	2.9	2.5	2.3	2.0	1.2	.9	.7	.7	2.0	3.5	2.6	1.8	1.6	1.6	1.1	.5	1.2	.9	.9	1.9	1.9	2.3	1.2	1.1	1.5	1.8	2.5	1.5	1.3	1.2	1.2	1.7	2.3
1.9	1.6	1.4	2.1	2.4	2.5	2.1	1.6	1.2	1.1	.9	1.8	2.6	1.9	1.9	2.1	2.5	1.9	1.5	1.4	1.6	1.6	1.6	1.5	1.5	1.1	1.2	1.1	1.5	1.7	1.5	1.3	1.2	1.6	1.3	1.3
1.4	1.4	1.3	1.3	1.4	1.6	1.6	1.7	1.6	1.3	1.8	1.4	1.4	1.3	1.6	1.8	1.4	1.4	1.5	1.6	1.6	1.9	1.9	1.6	1.3	1.3	1.3	1.5	1.4	1.4	1.5	1.4	1.1	1.3	1.3	1.2
1.0	.9	1.1	1.3	1.1	1.1	1.1	1.0	1.2	1.1	1.1	1.2	1.0	1.1	1.1	.8	.9	.9	.9	1.1	1.2	1.3	1.5	1.6	1.6	1.5	1.2	1.2	1.3	1.3	1.4	1.3	1.2	1.3	1.3	1.2
.9	.7	.7	.9	1.1	1.1	1.1	1.0	1.0	1.0	1.0	1.5	1.6	1.4	.9	.7	.6	.7	.7	.7	.7	.9	1.0	1.1	1.0	1.0	.8	.8	.8	1.0	1.2	1.4	1.1	1.2	.9	1.0
.6	.5	.6	.8	1.0	1.1	1.2	1.3	1.6	1.6	1.8	1.8	1.6	1.4	1.1	.7	.8	.7	.5	.6	.7	.8	.6	.4	.5	.5	.5	.6	.7	.7	.6	.6	.6	.6	.7	.6
.7	.7	.8	.9	.8	.9	1.2	1.5	1.7	1.3	1.2	1.2	1.2	1.0	.8	.7	.6	.6	.5	.5	.5	.4	.4	.4	.3	.3	.3	.3	.5	.6	.7	.9	1.1	1.1	.9	.8

Figure 64. ATOVS MEAN O-B brightness temperature differences (deg C). APRIL 2003
Channel: AMSUA-5 (700 hPa)
NOAA17, using all observations

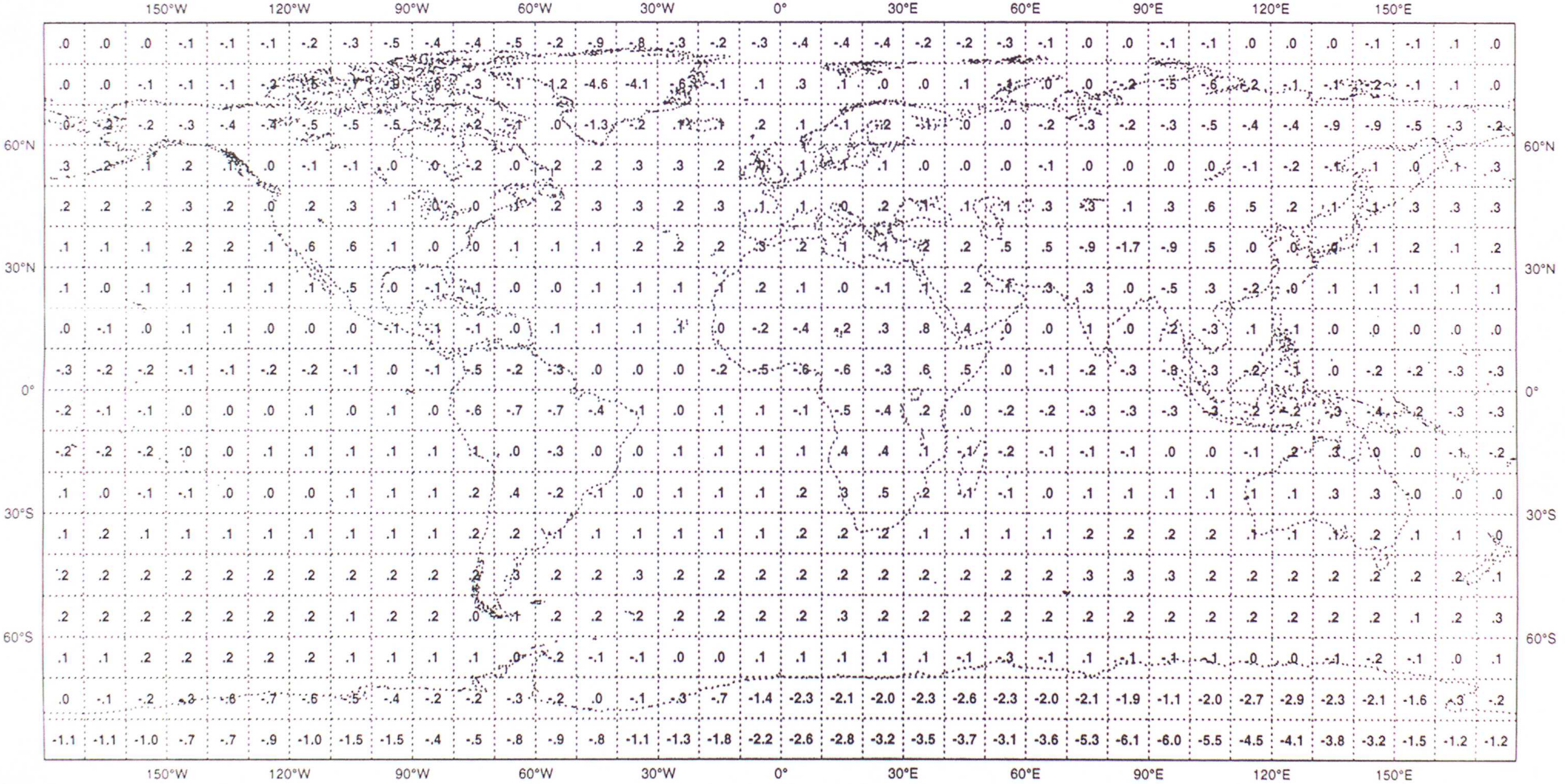

150°W 120°W 90°W 60°W 30°W 0° 30°E 60°E 90°E 120°E 150°E
60°N
30°N
0°
30°S
60°S
.0 .0 .0 -.1 -.1 -.1 -.2 -.3 -.5 -.4 -.4 -.5 -.2 -.9 -.8 -.3 -.2 -.3 -.4 -.4 -.4 -.2 -.2 -.3 -.1 .0 .0 -.1 -.1 .0 .0 .0 -.1 -.1 .1 .0
.0 .0 -.1 -.1 -.1 -.2 -.5 [illegible] -.9 -.8 -.3 -.1 -1.2 -4.6 -4.1 -.6 -.1 .1 .3 .1 .0 .0 .1 -.1 .0 .0 -.2 -.5 -.6 -.2 -.1 -.1 -.2 -.1 .1 .0
.0 -.2 -.2 -.3 -.4 -.4 -.5 -.5 -.5 -.2 -.2 -.1 .0 -1.3 -.2 .1 .1 .2 .1 -.1 .2 -.1 .0 .0 -.2 -.3 -.2 -.3 -.5 -.4 -.4 -.9 -.9 -.5 -.3 -.2
.3 .2 .1 .2 .1 .0 -.1 -.1 .0 .0 -.2 .0 .2 .2 .3 .3 .2 .0 .1 .1 .1 .0 .0 .0 -.1 .0 .0 .0 .0 -.1 -.2 -.1 .1 .0 .1 .3
.2 .2 .2 .3 .2 .0 .2 .3 .1 .0 .0 .1 .2 .3 .3 .2 .3 .1 .1 .0 .2 .1 .1 .1 .3 .3 .1 .3 .6 .5 .2 .1 .1 .3 .3 .3
.1 .1 .1 .2 .2 .1 .6 .6 .1 .0 .0 .1 .1 .1 .2 .2 .2 .3 .2 .1 .1 .2 .2 .5 .5 -.9 -1.7 -.9 .5 .0 .0 .4 .1 .2 .1 .2
.1 .0 .1 .1 .1 .1 .1 .5 .0 -.1 -.1 .0 .0 .1 .1 .1 .1 .2 .1 .0 -.1 .1 .2 .1 .3 .3 .0 -.5 .3 -.2 .0 .1 .1 .1 .1 .1
.0 -.1 .0 .1 .1 .0 .0 .0 -.1 -.1 -.1 .0 .1 .1 .1 .1 .0 -.2 -.4 .2 .3 .8 .4 .0 .0 .1 .0 .2 -.3 .1 -.1 .0 .0 .0 .0 .0
-.3 -.2 -.2 -.1 -.1 -.2 -.2 -.1 .0 -.1 -.5 -.2 -.3 .0 .0 .0 -.2 -.5 -.6 -.6 -.3 .6 .5 .0 -.1 -.2 -.3 -.8 -.3 -.2 -.1 .0 -.2 -.2 -.3 -.3
-.2 -.1 -.1 .0 .0 .0 .1 .0 .1 .0 -.6 -.7 -.7 -.4 -.1 .0 .1 .1 -.1 -.5 -.4 .2 .0 -.2 -.2 -.3 -.3 -.3 -.3 -.2 -.2 .3 -.4 .2 -.3 -.3
-.2 -.2 -.2 .0 .0 .1 .1 .1 .1 .1 .1 .0 -.3 .0 .0 .1 .1 .1 .1 .4 .4 .1 -.1 -.2 -.1 -.1 -.1 .0 .0 -.1 .2 .3 .0 .0 -.1 -.2
.1 .0 -.1 -.1 .0 .0 .0 .1 .1 .1 .2 .4 -.2 -.1 .0 .1 .1 .1 .2 .3 .5 .2 -.1 -.1 .0 .1 .1 .1 .1 .1 .1 .3 .3 .0 .0 .0
.1 .2 .1 .1 .1 .1 .1 .1 .1 .1 .2 .2 .1 .1 .1 .1 .1 .1 .2 .2 .2 .1 .1 .1 .1 .2 .2 .2 .2 .1 .1 .1 .2 .1 .1 .0
.2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .3 .2 .2 .3 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .3 .3 .3 .2 .2 .2 .2 .2 .2 .2 .1
.2 .2 .2 .2 .2 .2 .2 .1 .2 .2 .0 .1 .2 .2 .2 .2 .2 .2 .2 .3 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .1 .2 .3
.1 .1 .2 .2 .2 .2 .2 .1 .1 .1 .1 .0 -.2 -.1 -.1 .0 .0 .1 .1 .1 .1 .1 -.1 -.3 -.1 .1 -.1 -.1 -.1 .0 .0 -.1 -.2 -.1 .0 .1
.0 -.1 -.2 -.3 -.6 -.7 -.6 -.5 -.4 -.2 -.2 -.3 -.2 .0 -.1 -.3 -.7 -1.4 -2.3 -2.1 -2.0 -2.3 -2.6 -2.3 -2.0 -2.1 -1.9 -1.1 -2.0 -2.7 -2.9 -2.3 -2.1 -1.6 -.3 -.2
-1.1 -1.1 -1.0 -.7 -.7 -.9 -1.0 -1.5 -1.5 -.4 -.5 -.8 -.9 -.8 -1.1 -1.3 -1.8 -2.2 -2.6 -2.8 -3.2 -3.5 -3.7 -3.1 -3.6 -5.3 -6.1 -6.0 -5.5 -4.5 -4.1 -3.8 -3.2 -1.5 -1.2 -1.2

Figure 65. ATOVS SD O-B brightness temperature differences (deg C). **APRIL 2003**
Channel: AMSUA-5 (700 hPa)
NOAA17, using all observations

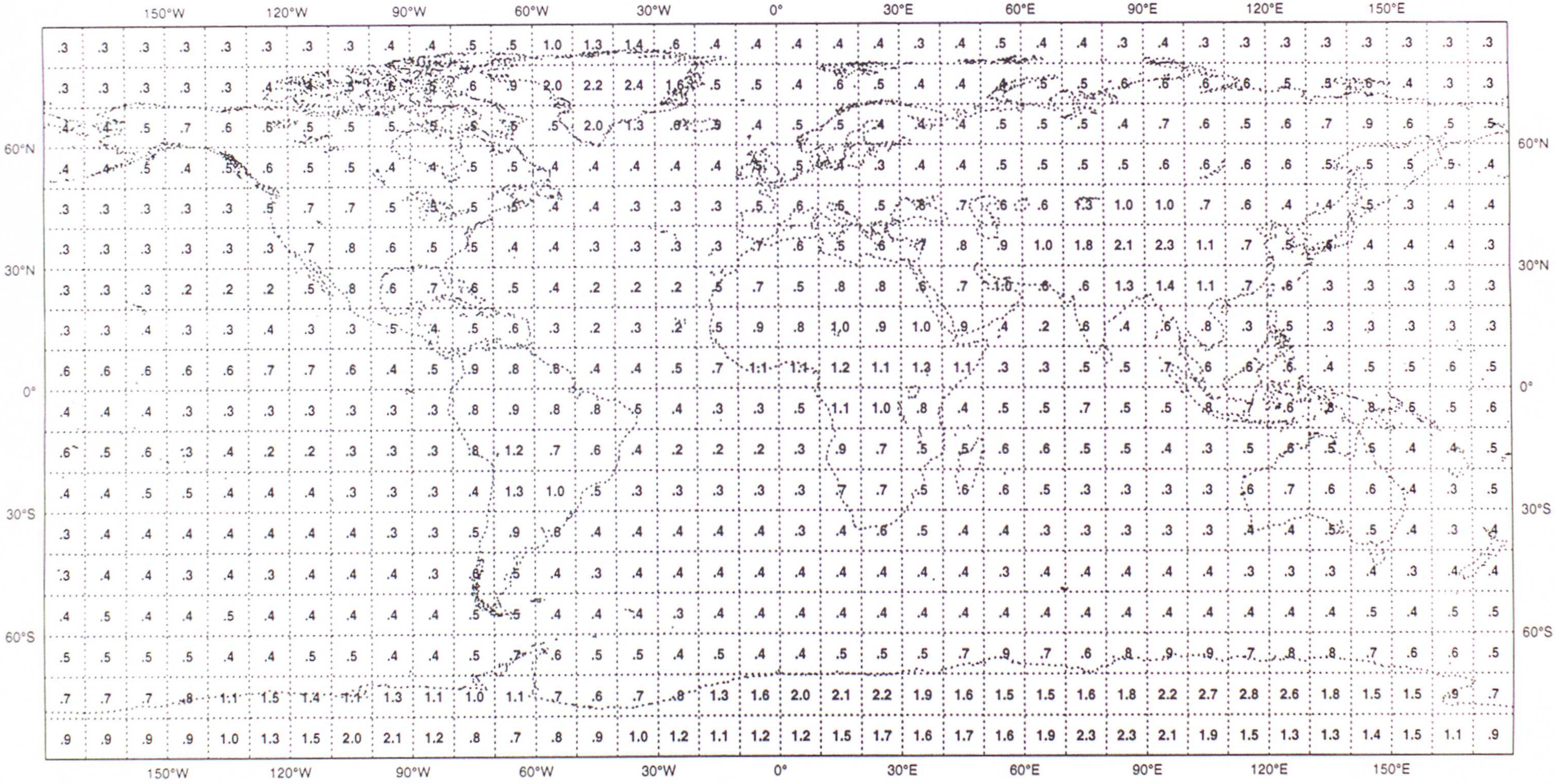

150°W 120°W 90°W 60°W 30°W 0° 30°E 60°E 90°E 120°E 150°E
60°N 30°N 0° 30°S 60°S
.3 .3 .3 .3 .3 .3 .3 .3 .4 .4 .5 .5 1.0 1.3 1.4 .6 .4 .4 .4 .4 .4 .3 .4 .5 .4 .4 .3 .4 .3 .3 .3 .3 .3 .3 .3 .3
.3 .3 .3 .3 .3 .4 .4 .3 .6 .5 .6 .9 2.0 2.2 2.4 1.6 .5 .5 .4 .6 .5 .4 .4 .4 .5 .5 .6 .6 .6 .6 .5 .5 .6 .4 .3 .3
.4 .4 .5 .7 .6 .6 .5 .5 .5 .5 .5 .5 .5 2.0 1.3 .6 .5 .4 .5 .5 .4 .4 .4 .5 .5 .5 .4 .7 .6 .5 .6 .7 .9 .6 .5 .5
.4 .4 .5 .4 .5 .6 .5 .5 .4 .4 .5 .5 .4 .4 .4 .4 .4 .5 .5 .4 .3 .4 .4 .5 .5 .5 .5 .6 .6 .6 .6 .5 .5 .5 .5 .4
.3 .3 .3 .3 .3 .5 .7 .7 .5 .5 .5 .5 .4 .4 .3 .3 .3 .5 .6 .6 .5 .8 .7 .6 .6 1.3 1.0 1.0 .7 .6 .4 .4 .5 .3 .4 .4
.3 .3 .3 .3 .3 .3 .7 .8 .6 .5 .5 .4 .4 .3 .3 .3 .3 .7 .6 .5 .6 .7 .8 .9 1.0 1.8 2.1 2.3 1.1 .7 .5 .6 .4 .4 .4 .3
.3 .3 .3 .2 .2 .2 .5 .8 .6 .7 .6 .5 .4 .2 .2 .2 .5 .7 .5 .8 .8 .6 .7 1.0 .6 .6 1.3 1.4 1.1 .7 .6 .3 .3 .3 .3 .3
.3 .3 .4 .3 .3 .4 .3 .3 .5 .4 .5 .6 .3 .2 .3 .2 .5 .9 .8 1.0 .9 1.0 .9 .4 .2 .6 .4 .6 .8 .3 .5 .3 .3 .3 .3 .3
.6 .6 .6 .6 .6 .7 .7 .6 .4 .5 .9 .8 .8 .4 .4 .5 .7 1.1 1.1 1.2 1.1 1.3 1.1 .3 .3 .5 .5 .7 .6 .6 .6 .4 .5 .5 .6 .5
.4 .4 .4 .3 .3 .3 .3 .3 .3 .3 .8 .9 .8 .8 .5 .4 .3 .3 .5 1.1 1.0 .8 .4 .5 .5 .7 .5 .5 .8 .7 .6 .8 .8 .5 .5 .6
.6 .5 .6 .3 .4 .2 .2 .3 .3 .3 .8 1.2 .7 .6 .4 .2 .2 .2 .3 .9 .7 .5 .5 .6 .6 .5 .5 .4 .3 .5 .6 .5 .5 .4 .4 .5
.4 .4 .5 .5 .4 .4 .4 .3 .3 .3 .4 1.3 1.0 .5 .3 .3 .3 .3 .3 .7 .7 .5 .6 .6 .5 .3 .3 .3 .3 .6 .7 .6 .6 .4 .3 .5
.3 .4 .4 .4 .4 .4 .4 .4 .3 .3 .5 .9 .8 .4 .4 .4 .4 .4 .3 .4 .6 .5 .4 .4 .3 .3 .3 .3 .3 .4 .4 .5 .5 .4 .3 .4
.3 .4 .4 .3 .4 .3 .4 .4 .4 .3 .6 .5 .4 .3 .4 .4 .4 .4 .4 .4 .4 .4 .4 .3 .4 .4 .4 .4 .4 .3 .3 .3 .4 .3 .4 .4
.4 .5 .4 .4 .5 .4 .4 .4 .4 .4 .5 .5 .4 .4 .4 .3 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .5 .4 .5 .5
.5 .5 .5 .5 .4 .4 .5 .5 .4 .4 .5 .7 .6 .5 .5 .4 .5 .4 .4 .5 .5 .5 .7 .9 .7 .6 .8 .9 .9 .7 .8 .8 .7 .6 .6 .5
.7 .7 .7 .8 1.1 1.5 1.4 1.1 1.3 1.1 1.0 1.1 .7 .6 .7 .8 1.3 1.6 2.0 2.1 2.2 1.9 1.6 1.5 1.5 1.6 1.8 2.2 2.7 2.8 2.6 1.8 1.5 1.5 .9 .7
.9 .9 .9 .9 1.0 1.3 1.5 2.0 2.1 1.2 .8 .7 .8 .9 1.0 1.2 1.1 1.2 1.2 1.5 1.7 1.6 1.7 1.6 1.9 2.3 2.3 2.1 1.9 1.5 1.3 1.3 1.4 1.5 1.1 .9

Figure 66. ATOVS MEAN O-B brightness temperature differences (deg C). APRIL 2003
Channel: AMSUA-7 (300 hPa)
NOAA17, using all observations

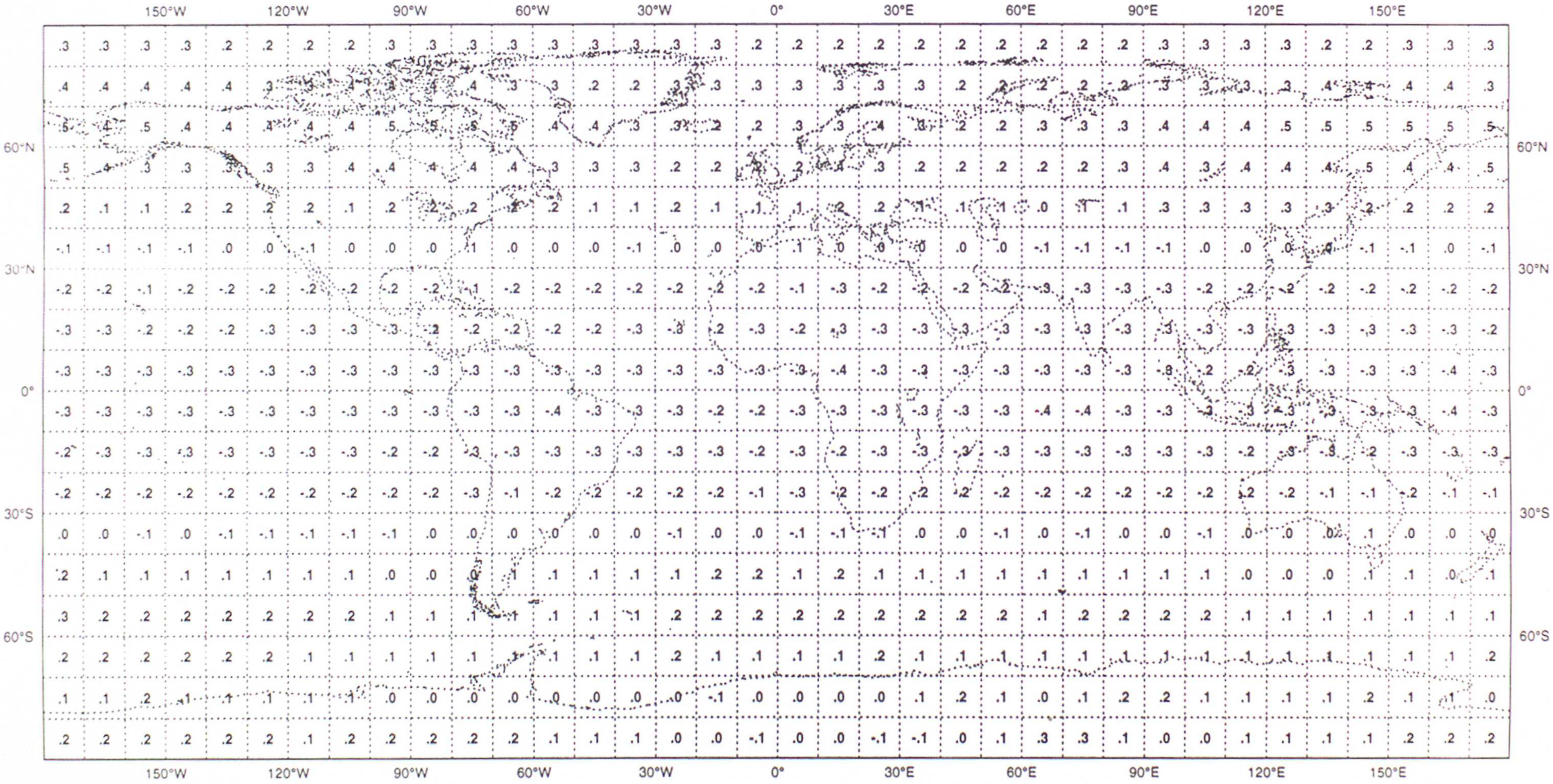

150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S

Figure 67. ATOVS SD O-B brightness temperature differences (deg C). APRIL 2003
Channel: AMSUA-7 (300 hPa)
NOAA17, using all observations

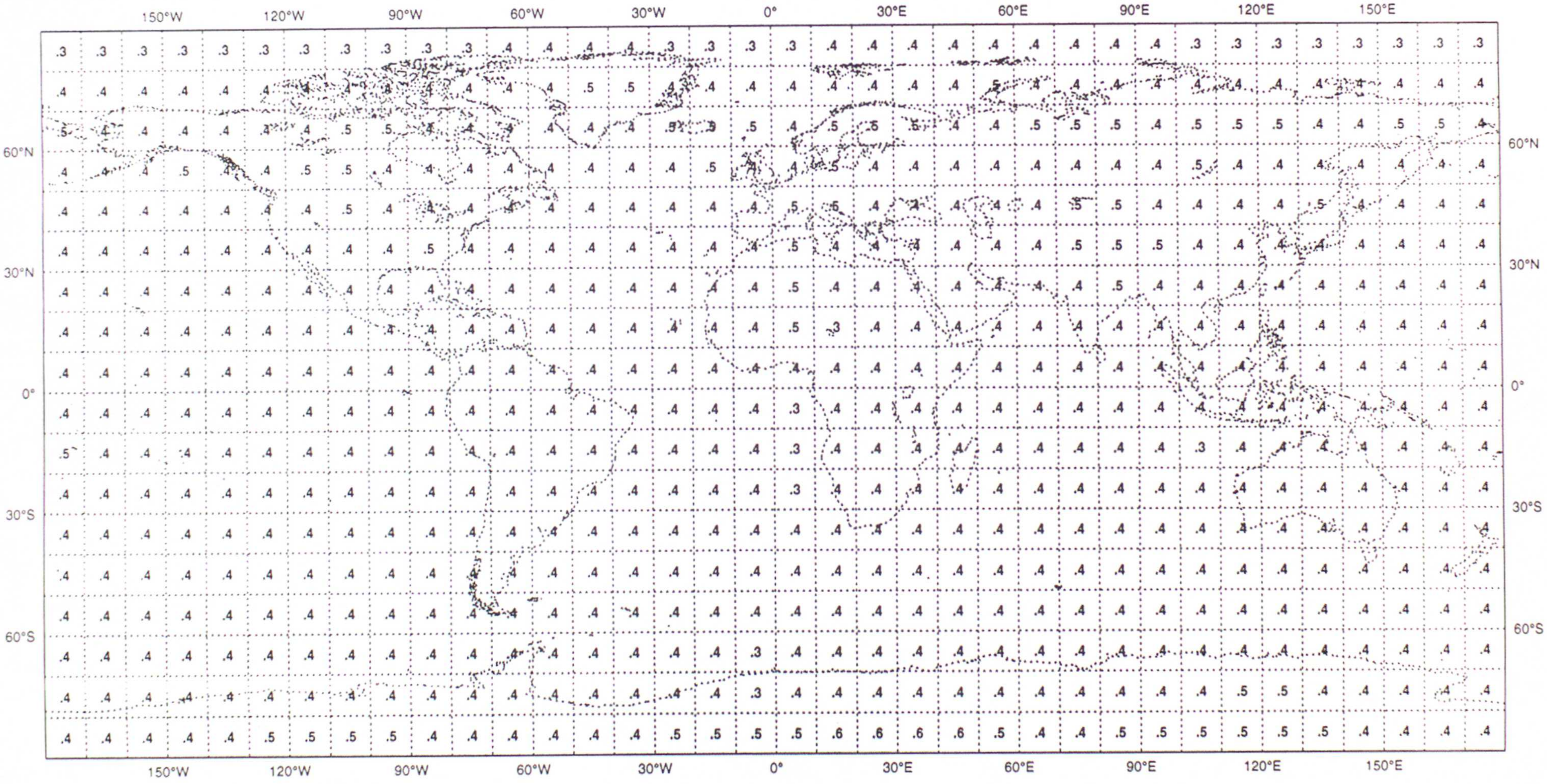

150°W 120°W 90°W 60°W 30°W 0° 30°E 60°E 90°E 120°E 150°E
60°N
30°N
0°
30°S
60°S
.3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .4 .4 .4 .4 .3 .3 .3 .3 .4 .4 .4 .4 .4 .4 .4 .4 .4 .3 .3 .3 .3 .3 .3 .3 .3
.4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .5 .5 .4 .4 .4 .4 .4 .4 .4 .4 .5 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4
.5 .4 .4 .4 .4 .4 .4 .5 .5 .4 .4 .4 .4 .4 .4 .5 .3 .5 .4 .5 .5 .5 .4 .4 .5 .5 .5 .4 .5 .5 .5 .4 .4 .5 .5 .4
.4 .4 .4 .5 .4 .4 .5 .5 .4 .4 .4 .4 .4 .4 .4 .4 .5 .4 .4 .5 .4 .4 .4 .4 .4 .4 .4 .4 .5 .4 .4 .4 .4 .4 .4 .4
.4 .4 .4 .4 .4 .4 .4 .5 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .5 .5 .4 .4 .4 .4 .4 .5 .5 .4 .4 .4 .4 .5 .4 .4 .4 .4
.4 .4 .4 .4 .4 .4 .4 .4 .4 .5 .4 .4 .4 .4 .4 .4 .4 .4 .5 .4 .4 .4 .4 .4 .4 .5 .5 .5 .4 .4 .4 .4 .4 .4 .4 .4
.4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .5 .4 .4 .4 .4 .4 .4 .4 .5 .4 .4 .4 .4 .4 .4 .4 .4 .4
.4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .5 .3 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4
.4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4
.4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .3 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4
.5 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .3 .4 .4 .4 .4 .4 .4 .4 .4 .4 .3 .4 .4 .4 .4 .4 .4 .4
.4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .3 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4
.4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4
.4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4
.4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4
.4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .3 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4
.4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .3 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .5 .5 .4 .4 .4 .4 .4
.4 .4 .4 .4 .4 .5 .5 .5 .5 .4 .4 .4 .4 .4 .4 .5 .5 .5 .5 .6 .6 .6 .6 .5 .4 .4 .5 .5 .5 .5 .5 .5 .4 .4 .4 .4

Figure 68. ATOVS MEAN O-B brightness temperature differences (deg C). APRIL 2003
Channel: AMSUA-9 (100 hPa)
NOAA17, using all observations

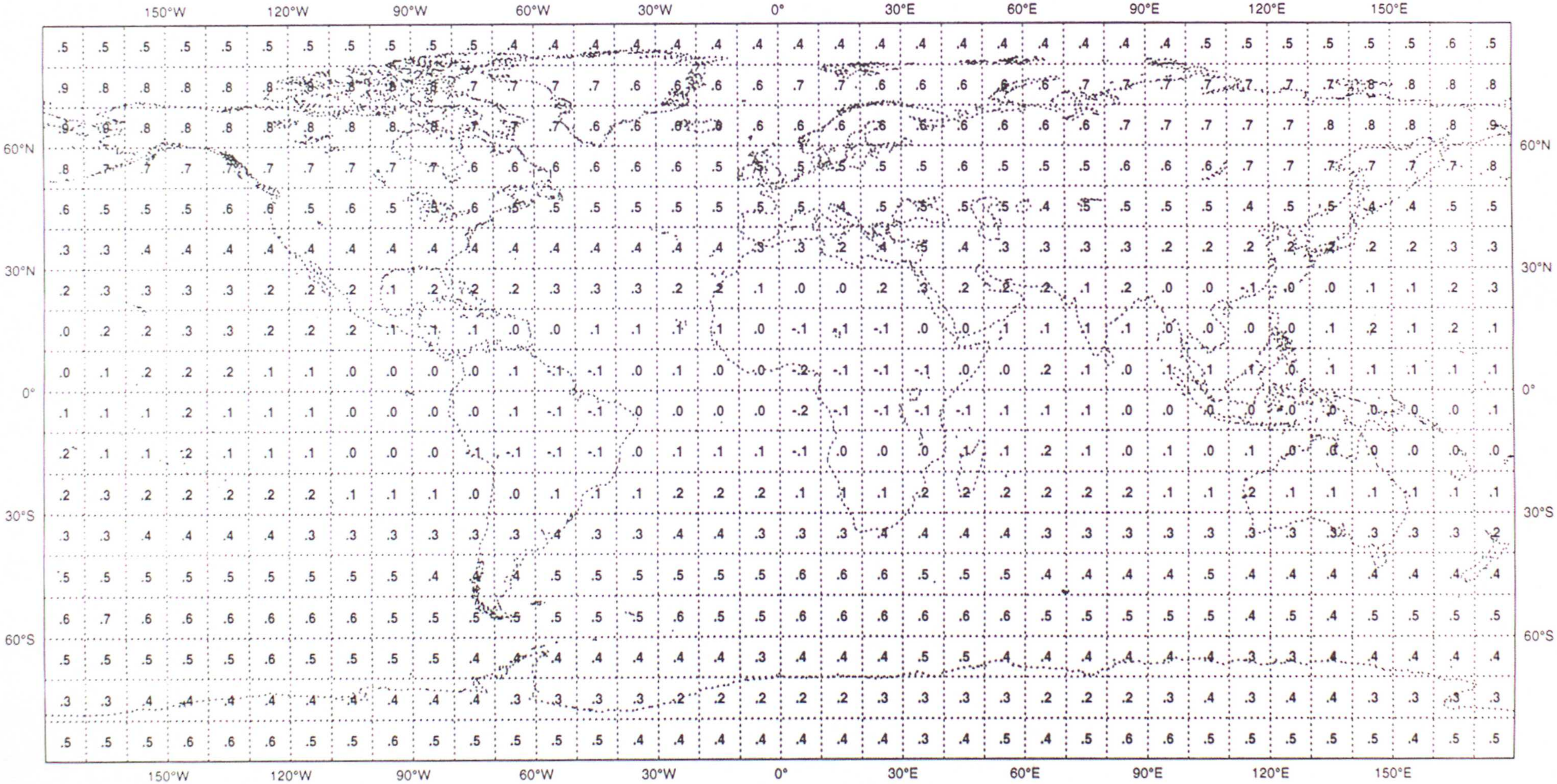

150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S
.5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .5 .5 .5 .5 .5 .5 .6 .5
.9 .8 .8 .8 .8 .8 .8 .8 .8 .8 .7 .7 .7 .7 .6 .6 .6 .6 .7 .7 .6 .6 .6 .6 .6 .7 .7 .7 .7 .7 .7 .7 .8 .8 .8 .8
.9 .8 .8 .8 .8 .8 .8 .8 .8 .8 .7 .7 .7 .6 .6 .6 .6 .6 .6 .6 .6 .6 .6 .6 .6 .6 .7 .7 .7 .7 .7 .8 .8 .8 .8 .9
.8 .7 .7 .7 .7 .7 .7 .7 .7 .7 .6 .6 .6 .6 .6 .6 .5 .5 .5 .5 .5 .5 .6 .5 .5 .5 .6 .6 .6 .7 .7 .7 .7 .7 .7 .8
.6 .5 .5 .5 .6 .6 .5 .6 .5 .5 .6 .5 .5 .5 .5 .5 .5 .5 .5 .4 .5 .5 .5 .5 .4 .5 .5 .5 .5 .4 .5 .5 .4 .4 .5 .5
.3 .3 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .3 .3 .2 .4 .5 .4 .3 .3 .3 .3 .2 .2 .2 .2 .2 .2 .2 .3 .3
.2 .3 .3 .3 .3 .2 .2 .2 .1 .2 .2 .2 .3 .3 .3 .2 .2 .1 .0 .0 .2 .3 .2 .2 .2 .1 .2 .0 .0 -.1 .0 .0 .1 .1 .2 .3
.0 .2 .2 .3 .3 .2 .2 .2 .1 .1 .1 .0 .0 .1 .1 .1 .1 .0 -.1 -.1 -.1 .0 .0 .1 .1 .1 .1 .0 .0 .0 .0 .1 .2 .1 .2 .1
.0 .1 .2 .2 .2 .1 .1 .0 .0 .0 .0 .1 -.1 -.1 .0 .1 .0 .0 -.2 -.1 -.1 -.1 .0 .0 .2 .1 .0 .1 .1 .1 .0 .1 .1 .1 .1 .1
.1 .1 .1 .2 .1 .1 .1 .0 .0 .0 .0 .1 -.1 -.1 .0 .0 .0 .0 -.2 -.1 -.1 -.1 -.1 .1 .1 .1 .0 .0 .0 .0 .0 .0 .0 .0 .0 .1
.2 .1 .1 .2 .1 .1 .1 .0 .0 .0 -.1 -.1 -.1 -.1 .0 .1 .1 .1 -.1 .0 .0 .0 .1 .1 .2 .1 .0 .1 .0 .1 .0 .0 .0 .0 .0 .0
.2 .3 .2 .2 .2 .2 .2 .1 .1 .1 .0 .0 .1 .1 .1 .2 .2 .2 .1 .1 .1 .2 .2 .2 .2 .2 .2 .1 .1 .2 .1 .1 .1 .1 .1 .1
.3 .3 .4 .4 .4 .4 .3 .3 .3 .3 .3 .3 .4 .3 .3 .4 .4 .3 .3 .3 .4 .4 .4 .4 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .2
.5 .5 .5 .5 .5 .5 .5 .5 .5 .4 .4 .4 .5 .5 .5 .5 .5 .5 .6 .6 .6 .5 .5 .5 .4 .4 .4 .4 .5 .4 .4 .4 .4 .4 .4 .4
.6 .7 .6 .6 .6 .6 .6 .6 .5 .5 .5 .5 .5 .5 .5 .6 .5 .5 .6 .6 .6 .6 .6 .6 .5 .5 .5 .5 .5 .4 .5 .4 .5 .5 .5 .5
.5 .5 .5 .5 .5 .6 .5 .5 .5 .5 .4 .4 .4 .4 .4 .4 .4 .3 .4 .4 .4 .5 .5 .4 .4 .4 .4 .4 .4 .3 .3 .4 .4 .4 .4 .4
.3 .3 .4 .4 .4 .4 .4 .4 .4 .4 .4 .3 .3 .3 .3 .2 .2 .2 .2 .2 .3 .3 .3 .3 .2 .2 .2 .3 .4 .3 .4 .4 .3 .3 .3 .3
.5 .5 .5 .6 .6 .6 .5 .5 .6 .5 .5 .5 .5 .5 .4 .4 .4 .4 .4 .4 .4 .3 .4 .5 .4 .5 .6 .6 .5 .5 .5 .5 .5 .4 .5 .5

Figure 69. ATOVS SD O-B brightness temperature differences (deg C). APRIL 2003
Channel: AMSUA-9 (100 hPa)
NOAA17, using all observations

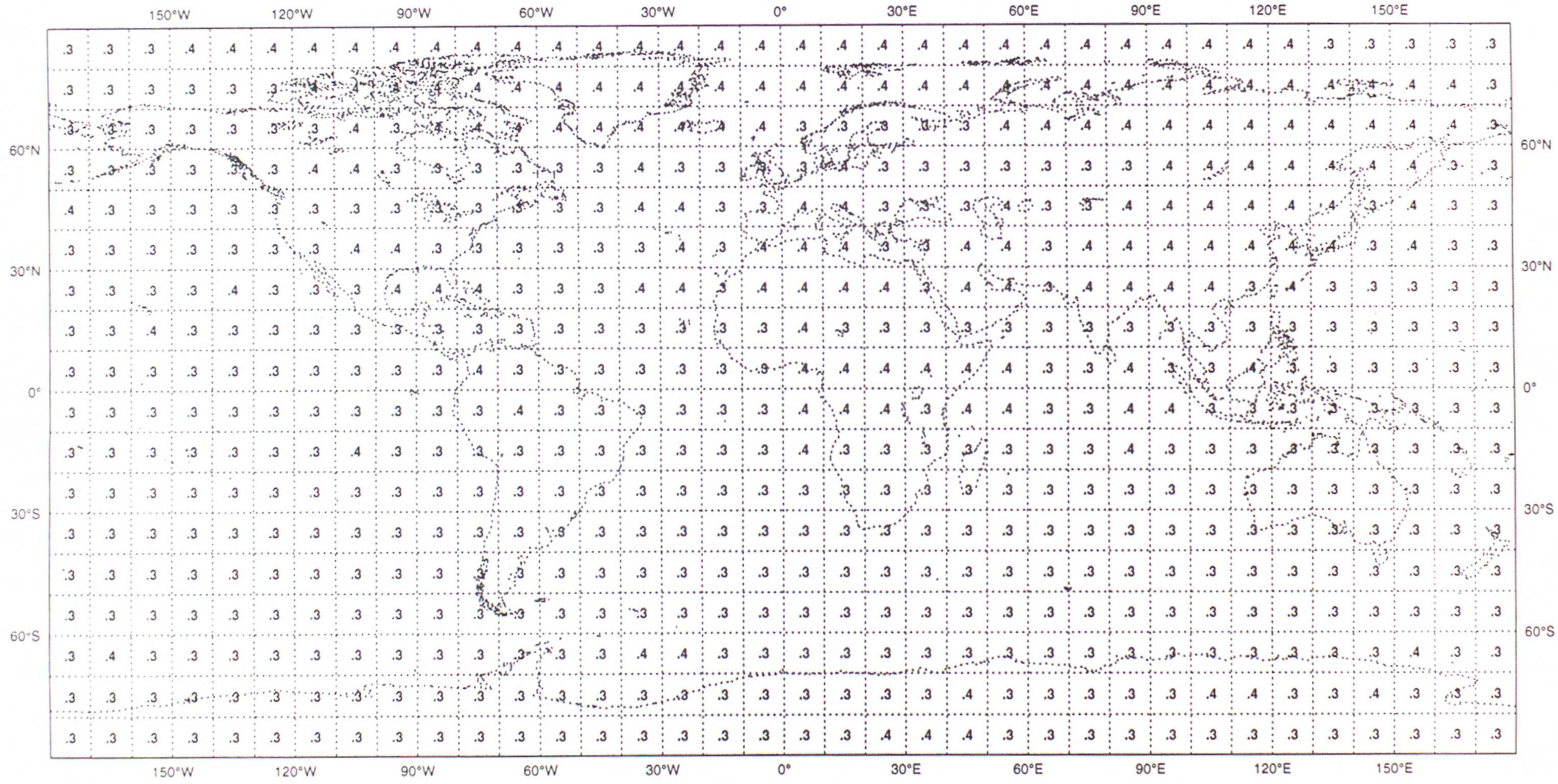

150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S
.3 .3 .3 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .3 .3 .3 .3 .3
.3 .3 .3 .3 .3 .3 .4 .4 .3 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .3
.3 .3 .3 .3 .3 .3 .3 .4 .3 .4 .4 .4 .4 .4 .4 .4 .4 .4 .3 .3 .3 .3 .3 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .3
.3 .3 .3 .3 .3 .3 .4 .4 .3 .3 .3 .3 .3 .3 .4 .3 .3 .3 .3 .4 .3 .3 .3 .3 .3 .3 .3 .4 .4 .4 .4 .4 .4 .4 .3 .3
.4 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .4 .4 .3 .3 .4 .4 .3 .3 .3 .4 .3 .3 .4 .4 .4 .4 .4 .4 .3 .4 .3 .3
.3 .3 .3 .3 .3 .3 .3 .4 .4 .3 .3 .3 .3 .3 .3 .4 .3 .4 .4 .4 .3 .3 .4 .4 .3 .4 .4 .4 .4 .4 .4 .4 .3 .4 .3 .3
.3 .3 .3 .3 .4 .3 .3 .3 .4 .4 .4 .3 .3 .3 .4 .4 .3 .4 .4 .4 .4 .3 .4 .4 .3 .4 .4 .4 .4 .3 .4 .3 .3 .3 .3 .3
.3 .3 .4 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .4 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3
.3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .4 .3 .3 .3 .3 .3 .3 .3 .4 .4 .4 .4 .4 .4 .3 .3 .4 .3 .3 .4 .3 .3 .3 .3 .3 .3
.3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .4 .3 .3 .3 .3 .3 .3 .4 .4 .4 .3 .4 .4 .3 .3 .4 .4 .3 .3 .3 .3 .3 .3 .3 .3
.3 .3 .3 .3 .3 .3 .3 .4 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .4 .3 .3 .3 .3 .3 .3 .3 .4 .3 .3 .3 .3 .3 .3 .3 .3 .3
.3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3
.3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3
.3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3
.3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3
.3 .4 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .4 .4 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .4 .3 .3
.3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .4 .3 .3 .3 .3 .3 .4 .4 .3 .3 .4 .3 .3 .3
.3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .4 .4 .4 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3
150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E

TABLE 8

MONTHLY MONITORING OF MARINE SURFACE OBSERVATIONS (COSNA)
DATA TYPE:- DRIFTER
MONITORING CENTRE: BRACKNELL
MONTH: April 2003

Monitoring procedures		
Period		:One calendar month.
Data monitored		:Reports from each unique identifier for drifting buoy.
Area monitored		:10°N - 80°N, 85°W - 0°W
Standard of comparison		:Background field from UKMO global model.
Position		:Average latitude and longitude for period.
Observation times		:All hours combined.
Elements monitored		:Mean sea-level pressure (hPa) :Wind speed ($m\ s^{-1}$) :Wind direction (degrees)
Parameters monitored		
	:NOBS	:Number of observations received excluding duplicates.
	:NGE	:Number of observations with gross errors.
	:PGE	:Percentage of observations with gross errors.
	:SD	:SD of difference of observations from background values excluding those with gross errors.
	:BIAS	:Mean difference of observations from background values excluding those with gross errors. **N.B. A positive bias indicates the wind observation is veered to the background**
	:RMS	:Root Mean Square difference of observations from background values excluding those with gross errors
GROSS ERROR LIMITS	:15 hPa (pressure) :25 $m\ s^{-1}$ (Vector Wind)	

N.B. Observations of wind direction are only included in the wind direction statistics if the observed OR background wind speed > 5 $m\ s^{-1}$

IDENTIFIER	LAT.	LONG.	ELEM	NOBS	PGE	%REJ	SD	BIAS	RMS
MEAN SEA LEVEL PRESSURE									
26501	74.6	-12.0	P	287	0	35	0.9	0.2	0.9
41503	13.5	-70.6	P	506	0	0	0.7	-1.2	1.4
41522	22.1	-55.4	P	598	0	0	0.6	-0.9	1.1
41531	25.8	-65.2	P	583	0	0	0.7	0.3	0.8
41532	23.1	-69.3	P	738	0	26	0.7	0.4	0.8
41534	26.8	-61.2	P	609	0	0	0.5	0.2	0.6
41537	28.6	-68.2	P	598	0	0	0.5	0.4	0.6
41648	26.0	-70.3	P	17	0	29	0.3	-0.2	0.3
41649	16.3	-61.1	P	459	0	54	0.6	-2.4	2.5
41658	45.2	-25.5	P	738	0	29	1.1	-0.9	1.4
41659	30.6	-30.4	P	634	0	0	0.5	0.2	0.6
41666	36.1	-47.4	P	645	0	0	0.7	0.4	0.8
44585	41.6	-69.4	P	244	0	20	1.4	0.7	1.6
44601	35.2	-45.0	P	898	0	37	0.6	-0.6	0.9
44603	58.1	-34.2	P	685	0	2	0.8	-0.1	0.8
44605	53.0	-41.3	P	38	0	0	0.5	0.3	0.6
44606	29.6	-49.9	P	705	0	2	0.8	0.3	0.9
44608	35.8	-32.7	P	722	0	5	1.0	0.2	1.0
44609	53.9	-21.4	P	687	0	2	0.7	-0.5	0.9
44610	41.1	-38.2	P	1030	0	34	1.3	0.2	1.3
44611	57.5	-23.7	P	1265	0	45	1.2	0.1	1.2
44613	52.8	-30.1	P	677	0	3	1.3	0.1	1.3
44614	65.1	-27.9	P	1324	0	48	0.8	-0.1	0.8
44615	43.9	-46.9	P	678	0	1	0.7	-0.7	1.0
44616	35.9	-9.1	P	22	0	5	0.7	-1.1	1.3
44617	46.5	-41.1	P	60	0	100	1.0	9.5	9.6
44620	40.1	-38.7	P	682	0	2	0.9	0.2	0.9
44621	55.7	-38.5	P	54	0	0	0.2	0.0	0.2
44622	50.1	-44.5	P	11	0	0	0.2	-0.3	0.4
44627	31.1	-17.0	P	588	0	1	1.1	-0.7	1.3
44721	33.5	-33.1	P	65	0	3	0.7	-0.5	0.9
44723	41.7	-17.0	P	692	0	1	0.9	0.2	0.9
44726	61.1	-35.9	P	1344	0	52	2.9	-0.4	2.9
44730	55.9	-30.0	P	713	0	2	0.7	-0.1	0.7
44764	59.2	-17.9	P	1803	0	61	0.9	-0.1	0.9
44767	59.8	-8.5	P	1492	0	56	0.7	0.0	0.7
44768	45.7	-25.3	P	328	0	1	0.8	-0.7	1.0
44769	65.1	-30.3	P	922	0	50	2.2	-0.7	2.3
44773	43.4	-20.1	P	648	0	3	1.4	0.4	1.5
44774	45.0	-17.7	P	179	0	12	0.8	-0.1	0.8
44776	49.5	-23.5	P	237	0	14	0.7	0.3	0.7
44777	40.4	-42.5	P	122	0	14	0.5	0.2	0.6
44778	41.6	-49.8	P	141	0	15	0.6	0.5	0.8
44779	54.5	-37.8	P	197	0	26	1.0	-0.2	1.0
44780	60.4	-42.1	P	560	0	41	1.1	-0.1	1.1
47554	73.2	-76.7	P	537	0	31	0.8	0.2	0.8
62501	28.0	-35.1	P	308	0	2	0.6	0.7	0.9
62505	64.0	-9.8	P	1322	0	48	1.2	0.0	1.2
62508	45.8	-6.2	P	694	0	2	0.6	-0.5	0.8
62512	37.2	-8.8	P	813	0	25	1.6	0.2	1.6
62513	36.3	-26.8	P	691	0	3	0.9	0.5	1.0
62514	33.7	-23.4	P	675	0	1	0.8	0.2	0.9
62515	25.5	-23.8	P	712	0	1	0.5	0.1	0.6
62517	34.9	-19.6	P	1157	0	43	0.6	-0.1	0.6
62519	46.7	-4.4	P	693	0	10	0.9	-0.4	0.9
62520	48.3	-15.5	P	376	0	2	0.7	0.7	1.0
62551	43.5	-21.3	P	316	0	0	0.9	0.9	1.3
62552	38.7	-20.9	P	312	0	1	0.7	0.4	0.8
62553	36.0	-19.5	P	291	0	0	0.6	0.2	0.6
62554	40.7	-21.4	P	307	0	1	1.1	0.4	1.2

IDENTIFIER	LAT.	LONG.	ELEM	NOBS	PGE	%REJ	SD	BIAS	RMS
MEAN SEA LEVEL PRESSURE									
62555	38.1	-19.3	P	292	0	0	0.7	0.1	0.7
62573	47.4	-16.2	P	324	2	8	0.9	0.1	0.9
62599	56.8	-10.5	P	345	0	26	0.7	0.0	0.7
62600	50.7	-16.7	P	333	0	16	0.9	0.3	0.9
62696	62.5	-20.8	P	1302	0	49	1.2	0.0	1.2
62711	57.2	-56.1	P	975	0	38	1.3	0.3	1.3
62712	61.6	-38.5	P	1310	0	51	2.3	-0.8	2.5
62714	46.7	-31.9	P	127	0	2	0.8	0.1	0.8
62801	39.3	-24.4	P	707	1	9	1.2	0.8	1.5
62802	43.3	-23.7	P	674	0	2	1.1	0.6	1.2
62803	45.3	-15.9	P	657	2	19	2.9	1.5	3.3
62804	46.8	-16.4	P	683	0	2	1.0	-0.6	1.2
WIND SPEED									
41503	13.5	-70.6	SPEED	504	0	100	1.4	-0.2	1.4
41522	22.1	-55.4	SPEED	597	0	100	1.4	-0.1	1.4
41531	25.8	-65.2	SPEED	581	0	100	2.2	0.2	2.2
41532	23.1	-69.3	SPEED	735	0	100	1.9	-0.1	1.9
41534	26.8	-61.2	SPEED	607	0	100	2.4	-0.1	2.4
41537	28.6	-68.2	SPEED	592	0	100	1.9	0.2	1.9
41648	26.0	-70.3	SPEED	16	0	100	2.2	2.0	3.0
44585	41.6	-69.4	SPEED	150	1	100	2.8	3.8	4.7
44601	35.2	-45.0	SPEED	894	0	100	3.2	0.5	3.2
44615	43.9	-46.9	SPEED	675	0	100	2.7	1.9	3.3
44620	40.1	-38.7	SPEED	674	0	100	2.9	1.0	3.1
62573	47.4	-16.2	SPEED	320	2	100	2.5	-0.5	2.5
62711	57.2	-56.1	SPEED	964	0	100	2.6	1.5	3.0
WIND DIRECTION									
41503	13.5	-70.6	DIRN.	425	0	0	11.3	-12.6	16.9
41522	22.1	-55.4	DIRN.	443	0	0	10.3	-6.6	12.3
41531	25.8	-65.2	DIRN.	388	0	0	23.2	19.7	30.4
41532	23.1	-69.3	DIRN.	402	0	0	21.9	27.2	34.9
41534	26.8	-61.2	DIRN.	401	0	0	18.9	4.8	19.5
41537	28.6	-68.2	DIRN.	318	0	0	19.7	-19.6	27.8
41648	26.0	-70.3	DIRN.	16	0	0	5.4	65.2	65.5
44585	41.6	-69.4	DIRN.	116	1	0	27.2	37.1	46.0
44601	35.2	-45.0	DIRN.	627	0	0	18.5	6.0	19.5
44615	43.9	-46.9	DIRN.	551	0	0	17.6	-3.8	18.0
44620	40.1	-38.7	DIRN.	573	0	0	21.8	18.1	28.3
62573	47.4	-16.2	DIRN.	235	2	0	18.0	8.0	19.7
62711	57.2	-56.1	DIRN.	799	0	0	21.7	-6.1	22.5

TABLE 9

MONTHLY MONITORING OF AIRCRAFT OBSERVATIONS (COSNA)
MONITORING CENTRE: BRACKNELL
MONTH: April 2003

Monitoring procedures:

Period		:One calendar month.
Data monitored		:Statistics for each airline carrier.
Area monitored		:40°N - 70°N, 60°W - 0°W.
Standard of comparison		:Background field from UKMO global model.
Observation times		:All hours combined.
Level(s) monitored		:300.0 - 150.0 hPa
Elements monitored		:TEMP in °C ; WIND in m s^{-1}
Parameters monitored	:N REP.	:Number of observations received excluding duplicates.
	:PG	:Percentage of observations with gross errors.
	:PR	:Percentage of observations rejected by quality control including rejections from the duplicate check.
	:PC	:Percentage of observations with calm winds.
	:RMS	:Root Mean Square difference of observations from background values excluding those with gross errors in Temperature & vector wind.
	:BIAS	:Mean difference of observations from background values excluding those with gross errors in Temperature & vector wind.
GROSS ERROR LIMITS	:10.0 °C ; 60 m s^{-1} Vector Wind	
SELECTION CRITERIA	:N REP ≥ 20	

NB : All American ACARS data are grouped together and statistics are shown at the bottom of the table as "US ACARS". All ADS reports are similarly grouped together.

	TEMPERATURE					WIND					
IDENT.	N.REP.	PG	PR	RMS	BIAS	N.REP.	PG	PR	PC	RMS	BIAS
AAL	738	0	8	1.7	-0.1	642	0	10	0	7.5	0.7
AAR	25	0	0	1.4	-0.5	25	0	0	0	6.6	-0.6
ACA	1069	0	2	1.5	-0.2	1056	0	4	0	7.3	0.1
AEA	189	2	3	1.5	0.3	95	0	0	0	5.8	0.5
AEL	554	2	11	1.6	-0.5	458	0	13	0	7.6	0.9
AEW	30	0	0	1.2	-0.4	30	0	7	0	11.1	0.0
AFL	293	0	2	1.8	0.4	287	0	3	0	8.6	0.6
AFR	970	0	5	1.6	0.0	770	0	6	0	6.9	1.1
AIS	264	1	9	1.9	-0.8	235	0	10	0	8.2	0.7
AJM	279	0	4	1.7	-0.4	237	0	3	0	6.1	0.8
AMM	46	0	7	1.3	0.2	36	0	8	0	8.8	1.0
AMT	121	0	12	1.9	0.2	115	0	9	0	6.4	-0.3
AMX	190	1	4	1.3	-0.1	144	0	4	0	8.7	0.3
AZA	268	1	12	2.4	0.4	243	1	9	0	7.4	-0.2
BAF	28	0	0	1.6	-0.8	29	0	0	0	4.8	0.7
BAL	68	1	9	1.5	-0.7	52	0	8	0	4.9	1.6
BAW	594	0	9	1.8	-0.7	581	0	10	0	6.2	0.4
BPA	102	0	53	1.5	-0.4	84	0	10	0	10.1	-0.1
BWA	125	0	3	1.7	-0.2	85	0	4	0	6.1	1.0
CFC	36	0	8	1.9	0.3	34	0	9	0	6.9	1.2
CFG	557	1	6	1.7	-0.9	505	0	7	0	7.7	0.8
CGA	149	0	0	1.2	-0.5	141	0	0	0	4.0	0.5
CGF	50	0	2	1.3	-0.6	49	0	2	0	4.4	0.7
CGH	170	0	2	1.3	-0.3	159	0	1	0	4.1	0.9
CKS	141	1	9	1.8	0.2	141	1	9	0	7.0	0.8
CLX	269	0	2	1.6	-0.2	256	0	4	0	7.0	0.5
COA	142	1	43	1.5	-0.5	109	0	48	0	6.9	0.3
CRL	316	1	3	1.7	0.0	235	0	3	0	7.8	0.4
CUB	92	1	5	1.7	0.1	69	0	49	0	6.3	0.3
DAB	438	0	12	1.4	-0.4	408	0	13	0	4.2	0.6
DAI	344	0	5	1.3	0.1	319	0	5	0	4.2	0.8
DAL	657	1	14	1.7	-0.8	611	0	15	0	7.2	0.8
DBR	33	0	0	1.4	-0.3	32	0	0	0	5.9	0.2
DCE	80	1	8	1.4	-0.8	69	0	7	0	7.0	1.2
DCS	22	0	0	1.7	-0.9	23	0	4	0	7.3	0.6
DHL	123	0	100	6.3	-6.0	122	0	32	0	15.8	3.8
DLH	616	0	12	1.5	-0.1	599	0	12	0	6.1	0.7
EDW	54	0	4	1.3	-0.4	44	0	9	0	5.3	1.6
EEZ	46	2	7	1.6	-0.6	39	0	8	0	6.6	0.3
EIA	222	0	100	2.2	0.9	212	0	100	0	18.6	5.7
ELY	128	0	2	1.8	-0.4	116	0	1	0	6.2	0.8
FDX	797	1	26	1.4	0.0	806	0	27	0	7.0	0.9
FGS	186	0	2	1.5	0.4	169	0	1	0	4.0	1.1
FGZ	30	0	3	1.0	-0.3	30	0	3	0	3.4	1.2
FIN	189	1	5	1.5	0.0	185	0	4	0	5.6	0.2
GAF	36	3	11	1.9	-0.9	33	3	9	0	9.1	0.6
GCO	411	0	6	1.5	-0.1	416	0	57	0	11.8	2.9
GOJ	86	0	0	1.2	0.0	81	0	0	0	4.1	1.0
GRL	88	0	0	1.2	0.0	84	0	4	0	7.4	1.4
GTI	231	2	13	1.8	0.0	218	0	11	0	6.7	0.4
GVA	62	0	3	1.1	0.2	58	0	3	0	4.0	0.0
GVB	27	0	0	1.1	0.5	26	0	0	0	4.3	0.8
GVF	37	22	46	4.9	2.1	36	0	0	0	5.7	1.3
GVG	49	0	0	1.1	-0.2	44	0	0	0	4.9	0.2
GVH	44	0	0	1.2	-0.4	41	0	0	0	4.2	-0.4
GVL	66	0	3	1.3	0.0	65	0	3	0	5.0	0.6
GVR	139	0	1	1.5	-0.3	134	0	1	0	5.1	0.7
GVT	50	0	6	1.5	-0.6	43	0	5	0	4.6	1.1
GVW	47	0	2	1.2	-0.4	44	0	2	0	4.6	0.8

	TEMPERATURE					WIND					
IDENT.	N.REP.	PG	PR	RMS	BIAS	N.REP.	PG	PR	PC	RMS	BIAS
GVX	60	0	3	1.1	0.1	55	0	4	0	3.7	0.4
GWW	67	0	6	1.2	-0.3	64	0	6	0	4.3	1.1
GYM	26	0	0	0.7	0.4	22	0	0	0	3.7	0.0
IBE	1238	1	7	1.9	0.6	791	1	7	0	7.6	0.3
ICE	738	0	3	1.3	-0.2	715	1	5	0	7.0	0.7
IWD	114	0	4	2.0	-0.4	49	0	0	0	4.9	0.6
KLM	1153	1	3	1.7	0.0	1043	0	4	0	6.4	0.7
LAN	27	4	7	1.4	0.3	25	4	16	0	13.8	0.7
LDI	399	0	3	1.8	-0.9	297	0	3	0	7.5	0.3
LOT	132	1	6	2.1	-1.3	132	0	5	0	6.6	0.3
LTU	611	1	4	1.5	-0.3	536	0	4	0	6.0	0.3
MON	33	0	3	1.5	-0.8	29	0	3	0	6.1	1.0
MPD	146	1	2	1.7	0.5	79	0	6	0	6.8	1.1
MPH	395	1	4	2.0	-1.1	368	0	4	0	7.0	0.6
MYT	186	1	5	1.9	0.3	167	0	5	0	7.3	0.4
NAO	27	0	7	2.0	0.1	24	0	8	0	7.8	0.1
NCA	28	0	0	1.1	0.0	28	0	0	0	5.1	0.7
NWA	2792	1	3	1.5	0.1	2792	0	3	0	6.5	0.5
OAE	98	0	5	1.2	-0.1	100	1	66	0	13.8	4.0
PAC	348	1	7	1.8	0.0	340	0	5	0	6.2	0.2
RAM	158	0	3	1.3	0.2	103	2	65	0	7.0	0.2
RCH	542	1	20	2.5	0.4	464	0	100	0	9.8	0.8
RJA	28	0	0	1.3	0.3	28	0	0	0	4.9	-0.2
RZO	66	0	5	1.4	-0.7	44	0	0	0	7.4	-1.6
SEU	101	2	7	2.2	0.3	93	1	2	0	7.1	0.4
SLR	177	1	7	1.3	-0.6	166	0	11	0	8.1	0.9
SOO	20	0	20	1.7	1.4	20	0	20	0	5.3	0.2
SVA	26	4	8	1.8	-0.4	26	0	8	0	11.1	2.1
TAP	216	0	4	1.4	-0.2	116	0	4	0	6.6	0.3
TCX	45	0	4	1.5	0.4	37	0	0	0	5.7	0.9
THT	25	0	0	1.6	-0.7	23	0	0	0	3.7	0.7
TSC	43	0	2	1.6	0.0	39	0	8	0	10.2	1.7
UAL	139	0	60	2.0	-1.1	130	2	65	0	10.0	0.2
UPS	994	0	40	1.4	-0.1	975	0	41	0	7.3	0.3
USA	133	1	4	1.6	-0.5	107	1	5	0	7.0	0.9
VIR	147	1	5	1.2	-0.2	141	0	5	0	8.1	0.6
WOA	379	0	7	1.3	0.1	381	0	12	0	9.4	1.1
ZKN	31	0	0	1.4	-0.7	27	0	0	0	4.4	1.0
9VS	152	0	1	1.3	-0.2	144	0	1	0	4.3	0.1
EU	37222	0	20	1.3	0.0	37222	0	20	0	4.3	0.5
KL	659	0	10	1.2	0.5	659	0	9	0	4.8	0.6
N	2317	0	13	1.4	-0.1	2169	0	12	0	4.7	0.7
US ACARS	22103	8	36	1.3	0.1	22103	0	28	0	5.0	0.4

TABLE 10

MONTHLY MONITORING OF RADIOSONDE OBSERVATIONS (COSNA)
MONITORING CENTRE: BRACKNELL
MONTH: April 2003

Monitoring procedures

Period :One calendar month.

Data monitored :Reports from selected radiosonde TEMPs.

Area monitored :0°N - 90°N, 100°W - 40°E

Standard of comparison :Background field from UKMO global model.

Position :Average latitude and longitude for period.

Observation times :00, 12 UTC.

Level monitored :100 hPa.

Element monitored :GEOPOTENTIAL HEIGHT in metres

Parameters monitored :NUM OBS :Number of observations available at level shown during period.

:NUM GROSS :Number of gross errors at level shown during period.

:SD :SD of difference of observations from background values at level shown excluding those with gross errors.

:BIAS :Mean difference of observations from background values at level shown excluding those with gross errors.

GROSS ERROR LIMITS :Defined in Appendix I.1

WMO IDENT	OBS TIME	ELM	LEV	NUM OBS	NUM GROSS	SD	RMS	BIAS
DASAP1	12	Z	100	6	0	12.5	12.5	0.0
DBBH	12	Z	100	4	0	11.5	44.8	43.3
DBLK	00	Z	100	17	0	14.8	22.7	-17.2
DBLK	12	Z	100	7	0	11.0	12.3	-5.6
EBUQ	12	Z	100	19	0	7.3	28.8	27.9
ELML7	00	Z	100	11	0	13.5	27.3	23.7
ELML7	12	Z	100	10	0	14.3	29.1	25.3
FNPH	00	Z	100	4	0	7.8	25.5	-24.3
FNPH	12	Z	100	4	0	17.2	23.3	15.8
FNRS	00	Z	100	11	1	17.1	30.0	-24.6
FNRS	12	Z	100	11	0	13.2	17.7	-11.7
LDWR	00	Z	100	29	0	14.8	15.1	3.0
LDWR	12	Z	100	29	0	16.5	16.5	-1.7
OXVH2	00	Z	100	5	0	51.8	56.3	-22.2
OXVH2	12	Z	100	4	0	8.1	8.1	0.0
OXYH2	00	Z	100	5	0	9.5	12.7	-8.4
OXYH2	12	Z	100	5	0	11.6	16.8	-12.2
SWJS	00	Z	100	3	0	3.7	13.8	13.3
SWJS	12	Z	100	2	0	37.5	49.0	31.5
V2XM	00	Z	100	7	0	13.4	14.2	4.6
V2XM	12	Z	100	8	0	9.5	10.4	4.3
WPKD	00	Z	100	2	0	3.5	5.7	4.5
WPKD	12	Z	100	4	0	8.9	8.9	0.5
ZCBP6	00	Z	100	7	0	33.3	51.6	39.4
ZCBP6	12	Z	100	6	0	13.2	28.7	25.5
03953	00	Z	100	29	0	16.4	19.8	11.0
03953	12	Z	100	30	0	14.7	15.9	5.9
04018	00	Z	100	29	0	12.4	12.5	-0.9
04018	12	Z	100	29	0	15.8	16.1	3.2
04220	00	Z	100	28	0	24.8	33.0	-21.7
04220	12	Z	100	29	0	14.4	21.7	-16.2
04270	00	Z	100	27	0	14.8	20.1	-13.5
04270	12	Z	100	28	0	13.1	17.1	-11.0
04339	00	Z	100	27	1	14.3	16.1	-7.3
04339	12	Z	100	28	0	15.0	15.6	-4.3
04360	00	Z	100	25	0	15.5	20.5	-13.5
04360	12	Z	100	28	1	15.1	21.3	-15.1
08001	00	Z	100	17	0	26.7	27.4	-6.2
08001	12	Z	100	20	0	31.8	32.5	-6.5
08508	12	Z	100	27	0	23.4	41.8	34.6
08522	12	Z	100	5	0	4.4	22.6	22.2
08594	12	Z	100	19	0	11.9	13.9	7.2
71600	00	Z	100	28	0	17.8	17.8	0.6
71600	12	Z	100	30	0	14.5	16.2	7.1
72201	00	Z	100	27	0	23.0	24.4	8.2
72201	12	Z	100	30	0	26.0	35.7	24.5
72402	00	Z	100	26	0	12.4	49.2	47.6
72402	12	Z	100	29	0	14.7	67.6	66.0
74494	00	Z	100	25	0	12.4	14.8	8.0
74494	12	Z	100	26	0	12.9	14.0	5.5
78016	00	Z	100	25	0	14.7	29.2	25.3
78016	12	Z	100	29	0	26.7	43.1	33.9

TABLE 11

MONTHLY MONITORING OF RADIOSONDE OBSERVATIONS (COSNA)
MONITORING CENTRE: BRACKNELL
MONTH: April 2003

Monitoring procedures:

Period		:One calendar month.
Data monitored		:Reports from selected radiosonde TEMPs.
Area monitored		:0°N - 90°N, 100°W - 40°E
Standard of comparison		:Background field from UKMO global model.
Position		:Average latitude and longitude for period.
Observation times		:00, 12 UTC.
Level monitored		:500 hPa.
Element monitored		:GEOPOTENTIAL HEIGHT in metres
Parameters monitored	:NUM OBS	:Number of observations available at level shown during period.
	:NUM GROSS	:Number of gross errors at level shown during period.
	:SD	:SD of difference of observations from background values at level shown excluding those with gross errors.
	:BIAS	:Mean difference of observations from background values at level shown excluding those with gross errors.

GROSS ERROR LIMITS :Defined in Appendix I.1

WMO IDENT	OBS TIME	ELM	LEV	NUM OBS	NUM GROSS	SD	RMS	BIAS
DASAP1	12	Z	500	6	0	7.9	8.6	-3.5
DASAP3	12	Z	500	1	0	0.0	0.0	0.0
DBBH	12	Z	500	4	0	4.3	4.4	-1.0
DBLK	00	Z	500	17	0	8.7	8.8	-0.7
DBLK	12	Z	500	7	0	5.2	8.2	6.3
EBUQ	12	Z	500	19	0	6.3	7.6	4.2
ELML7	00	Z	500	11	0	5.1	5.3	1.1
ELML7	12	Z	500	12	0	6.5	6.9	2.2
FNPH	00	Z	500	8	0	8.4	13.2	-10.1
FNPH	12	Z	500	7	0	11.5	12.8	-5.6
FNRS	00	Z	500	13	1	9.0	20.0	-17.8
FNRS	12	Z	500	12	0	15.2	21.0	-14.5
LDWR	00	Z	500	29	0	9.0	9.5	3.0
LDWR	12	Z	500	29	0	10.4	10.6	2.5
OXVH2	00	Z	500	5	0	34.5	37.5	-14.6
OXVH2	12	Z	500	4	0	10.5	22.8	20.3
OXYH2	00	Z	500	6	0	4.7	9.6	8.3
OXYH2	12	Z	500	5	0	8.1	8.9	3.6
SWJS	00	Z	500	3	0	12.5	12.5	0.3
SWJS	12	Z	500	2	0	31.0	38.0	22.0
V2XM	00	Z	500	8	0	9.9	11.2	5.3
V2XM	12	Z	500	8	1	12.5	13.8	6.0
WPKD	00	Z	500	2	0	7.0	11.4	-9.0
WPKD	12	Z	500	4	0	5.9	6.2	2.0
ZCBP6	00	Z	500	7	0	14.7	28.4	24.3
ZCBP6	12	Z	500	6	0	11.1	12.1	4.8
03953	00	Z	500	29	0	8.5	8.7	1.9
03953	12	Z	500	30	0	7.9	8.6	3.4
04018	00	Z	500	29	0	8.6	11.4	7.4
04018	12	Z	500	30	0	7.9	13.5	11.0
04220	00	Z	500	28	0	14.5	14.9	3.5
04220	12	Z	500	29	0	13.1	15.3	7.9
04270	00	Z	500	28	0	10.7	12.1	5.5
04270	12	Z	500	28	0	10.7	13.0	7.4
04339	00	Z	500	27	1	11.9	14.7	8.7
04339	12	Z	500	29	0	10.2	13.9	9.4
04360	00	Z	500	27	0	9.0	9.2	1.9
04360	12	Z	500	28	1	13.0	14.2	5.6
08001	00	Z	500	21	0	15.2	15.6	-3.5
08001	12	Z	500	27	0	17.3	18.4	-6.4
08508	12	Z	500	27	0	8.7	8.7	0.3
08522	12	Z	500	7	0	3.5	4.3	2.6
08594	12	Z	500	21	0	4.9	6.4	-4.0
71600	00	Z	500	28	0	7.4	10.0	-6.8
71600	12	Z	500	30	0	8.8	9.0	1.4
72201	00	Z	500	28	0	9.0	9.6	-3.4
72201	12	Z	500	30	0	5.4	5.8	-2.0
72402	00	Z	500	28	0	5.0	6.8	4.6
72402	12	Z	500	29	0	6.3	6.9	2.8
74494	00	Z	500	29	0	7.9	8.9	-4.2
74494	12	Z	500	30	0	5.0	5.7	-2.7
78016	00	Z	500	29	0	8.2	9.2	4.1
78016	12	Z	500	29	0	12.1	15.3	9.3

TABLE 12

MONTHLY MONITORING OF RADIOSONDE OBSERVATIONS (COSNA)
MONITORING CENTRE: BRACKNELL
MONTH: April 2003

Monitoring procedures

Period		:One calendar month.
Data monitored		:Reports from selected radiosonde TEMPs.
Area monitored		:0°N - 90°N, 100°W - 40°E
Standard of comparison		:Background field from UKMO global model.
Position		:Average latitude and longitude for period.
Observation times		:00, 12 UTC.
Level monitored		:100 hPa.
Element monitored		:VECTOR WIND in m s^{-1}
Parameters monitored	:NUM OBS	:Number of observations available at level shown during period.
	:NUM GROSS	:Number of gross errors at level shown during period.
	:UBIAS,VBIAS	:Mean difference of observations of U and V components from background values at level shown excluding those with gross errors.
	:RMS	:Root Mean Square difference of observations from background values at level shown excluding those with gross errors.

GROSS ERROR LIMITS :Defined in Appendix I.2

WMO IDENT	OBS TIME	ELM	LEV	NUM OBS	NUM GROSS	% REJ	RMS	UBIAS	VBIAS
DASAP1	12	V	100	5	0	0	2.5	0.8	0.5
DBBH	12	V	100	4	0	0	3.3	0.0	1.0
DBLK	00	V	100	15	0	0	3.7	1.1	0.7
DBLK	12	V	100	7	0	14	5.1	2.1	-0.4
EBUQ	12	V	100	19	0	5	7.7	1.4	0.0
ELML7	00	V	100	9	0	0	4.2	-0.5	-1.2
ELML7	12	V	100	9	0	0	3.8	0.2	0.8
FNPH	00	V	100	3	0	0	2.5	-0.1	-1.2
FNPH	12	V	100	4	0	0	6.1	2.3	-1.2
FNRS	00	V	100	12	0	0	4.5	0.2	0.1
FNRS	12	V	100	11	0	0	5.2	-0.1	1.8
LDWR	00	V	100	29	0	0	3.2	0.4	-0.4
LDWR	12	V	100	29	0	0	2.8	0.5	-0.2
OXVH2	00	V	100	4	0	0	4.0	-0.2	1.7
OXVH2	12	V	100	4	0	0	2.0	1.0	-0.2
OXYH2	00	V	100	3	0	0	9.7	5.9	1.7
OXYH2	12	V	100	2	0	0	2.0	0.1	0.6
SWJS	00	V	100	3	0	0	2.8	0.9	0.8
SWJS	12	V	100	1	0	0	4.5	2.6	3.6
V2XM	00	V	100	6	0	0	4.2	-0.7	2.0
V2XM	12	V	100	7	0	0	3.5	-1.4	0.2
WPKD	00	V	100	2	0	0	3.9	-2.5	-1.2
WPKD	12	V	100	3	0	0	10.6	-1.9	2.5
ZCBP6	00	V	100	7	0	0	3.9	0.5	-1.4
ZCBP6	12	V	100	4	0	0	5.3	-1.7	-2.3
03953	00	V	100	29	0	0	3.1	0.4	0.2
03953	12	V	100	30	0	0	2.7	-0.7	0.4
04018	00	V	100	29	0	0	4.4	0.6	0.8
04018	12	V	100	29	0	0	4.4	0.6	0.2
04220	00	V	100	28	0	0	3.0	0.2	0.7
04220	12	V	100	29	0	0	2.8	0.6	0.4
04270	00	V	100	27	0	0	3.2	0.2	0.0
04270	12	V	100	28	0	0	3.1	0.1	0.3
04339	00	V	100	19	0	5	7.0	-1.5	0.0
04339	12	V	100	28	0	0	5.0	-0.2	-0.5
04360	00	V	100	25	0	0	2.9	0.0	0.3
04360	12	V	100	28	0	0	3.0	0.1	0.3
08001	00	V	100	16	0	0	4.5	0.1	-1.7
08001	12	V	100	18	0	0	3.9	-0.2	-0.5
08508	12	V	100	13	0	0	4.1	0.1	1.2
08522	12	V	100	3	0	0	3.9	-1.2	2.1
08594	12	V	100	21	0	100	4.6	-1.3	2.0
71600	00	V	100	27	0	0	3.5	-0.1	0.0
71600	12	V	100	29	0	0	4.1	0.6	1.2
72201	00	V	100	27	0	0	4.7	0.3	1.8
72201	12	V	100	30	0	0	5.5	2.1	-0.4
72402	00	V	100	26	0	0	4.0	0.4	0.5
72402	12	V	100	29	0	0	4.5	0.9	-0.1
74494	00	V	100	24	0	100	2.6	0.7	-0.1
74494	12	V	100	26	0	100	3.0	0.8	0.7
78016	00	V	100	25	0	0	4.7	0.8	0.0
78016	12	V	100	28	0	0	5.2	1.5	1.0

TABLE 13

MONTHLY MONITORING OF RADIOSONDE OBSERVATIONS (COSNA)
MONITORING CENTRE: BRACKNELL
MONTH: April 2003

Monitoring procedures

Period :One calendar month.

Data monitored :Reports from selected radiosonde TEMPs.

Area monitored :0°N - 90°N, 100°W - 40°E

Standard of comparison :Background field from UKMO global model.

Position :Average latitude and longitude for period.

Observation times :00, 12 UTC.

Level monitored :500 hPa.

Element monitored :VECTOR WIND in m s^{-1}

Parameters monitored :NUM OBS :Number of observations available at level shown during period.

:NUM GROSS :Number of gross errors at level shown during period.

:UBIAS,VBIAS: Mean difference of observations of U and V components from background values at level shown excluding those with gross errors.

:RMS :Root Mean Square difference of observations from background values at level shown excluding those with gross errors.

GROSS ERROR LIMITS :Defined in Appendix I.2

WMO IDENT	OBS TIME	ELM	LEV	NUM OBS	NUM GROSS	% REJ	RMS	UBIAS	VBIAS
DASAP1	12	V	500	5	0	0	1.9	0.1	-0.1
DASAP3	12	V	500	1	0	0	1.1	0.5	1.0
DBBH	12	V	500	4	0	0	5.6	2.0	0.5
DBLK	00	V	500	17	0	0	3.5	-0.4	1.2
DBLK	12	V	500	7	0	0	2.6	0.4	0.6
EBUQ	12	V	500	19	0	0	5.4	-0.3	-3.1
ELML7	00	V	500	9	0	0	2.3	0.0	-0.1
ELML7	12	V	500	11	0	0	3.6	-0.5	-0.7
FNPH	00	V	500	8	0	0	4.2	-0.3	0.5
FNPH	12	V	500	7	0	0	5.0	-0.8	-0.3
FNRS	00	V	500	14	0	0	4.7	-1.5	2.2
FNRS	12	V	500	12	0	0	3.2	-0.9	1.2
LDWR	00	V	500	29	0	0	3.3	0.6	-0.3
LDWR	12	V	500	29	0	0	3.3	0.0	-1.1
OXVH2	00	V	500	5	0	0	3.3	0.1	-1.1
OXVH2	12	V	500	4	0	0	4.0	-1.1	0.6
OXYH2	00	V	500	6	0	33	30.2	4.3	-10.8
OXYH2	12	V	500	3	0	0	6.8	1.0	3.9
SWJS	00	V	500	3	0	0	2.4	0.0	1.2
SWJS	12	V	500	1	0	0	4.3	-3.5	2.5
V2XM	00	V	500	8	0	0	4.5	1.4	1.8
V2XM	12	V	500	9	0	0	4.5	-0.5	0.3
WPKD	00	V	500	2	0	0	4.9	-0.5	-3.0
WPKD	12	V	500	4	0	25	11.1	-2.9	0.0
ZCBP6	00	V	500	7	0	0	4.8	-0.8	0.8
ZCBP6	12	V	500	5	0	0	3.3	1.2	0.5
03953	00	V	500	29	0	0	3.9	-1.2	-0.3
03953	12	V	500	30	0	0	5.5	0.6	1.3
04018	00	V	500	28	0	0	4.1	0.2	-1.1
04018	12	V	500	30	0	0	3.5	1.1	-1.2
04220	00	V	500	28	0	0	4.7	0.1	0.5
04220	12	V	500	29	0	0	5.0	0.0	0.5
04270	00	V	500	27	0	0	4.9	0.6	0.6
04270	12	V	500	28	0	0	4.4	0.3	0.5
04339	00	V	500	24	0	0	6.8	2.0	-0.6
04339	12	V	500	29	0	0	6.1	-0.6	-0.7
04360	00	V	500	27	0	0	5.2	1.2	-0.3
04360	12	V	500	29	0	0	5.2	0.4	0.3
08001	00	V	500	21	0	0	3.0	0.4	0.1
08001	12	V	500	26	0	0	4.5	0.6	0.2
08508	12	V	500	13	0	0	3.6	-0.3	0.2
08522	12	V	500	7	0	0	4.1	1.5	1.3
08594	12	V	500	23	0	100	4.4	-1.3	-1.0
71600	00	V	500	28	0	0	4.6	-0.1	-1.3
71600	12	V	500	30	0	0	3.7	-0.4	0.6
72201	00	V	500	28	0	0	3.0	-0.7	0.2
72201	12	V	500	30	0	0	2.9	-0.1	-0.8
72402	00	V	500	29	0	0	3.4	-0.7	-0.3
72402	12	V	500	29	0	0	4.6	-0.7	0.4
74494	00	V	500	29	0	100	3.6	-0.8	0.1
74494	12	V	500	28	0	100	3.7	-1.0	1.0
78016	00	V	500	29	0	0	4.5	-0.6	0.4
78016	12	V	500	29	0	0	4.2	0.7	0.4

APPENDIX I

1. The gross error limits for observation minus background differences of geopotential height in Tables 5, 10 and 11 are:-

Level (hPa)	Geopotential height (metres)
1000	100
850	100
700	100
500	150
400	175
300	200
250	225
200	250
150	275
100	300
70	375
50	400
30	450

The weighted RMS values used in Table 5,10 and 11 are calculated using the following weights:-

Level (hPa)	Weight
1000	3.70
850	3.40
700	2.90
500	2.20
400	1.90
300	1.60
250	1.50
200	1.37
150	1.19
100	1.00
70	0.87
50	0.80
30	0.64

2. The gross error limits for observation minus background differences of windspeed in Tables 6,12 and 13 are:-

Level (hPa)	Windspeed m s^{-1}
1000	35
850	35
700	40
500	45
400	50
300	60
250	60
200	50
150	50
100	45